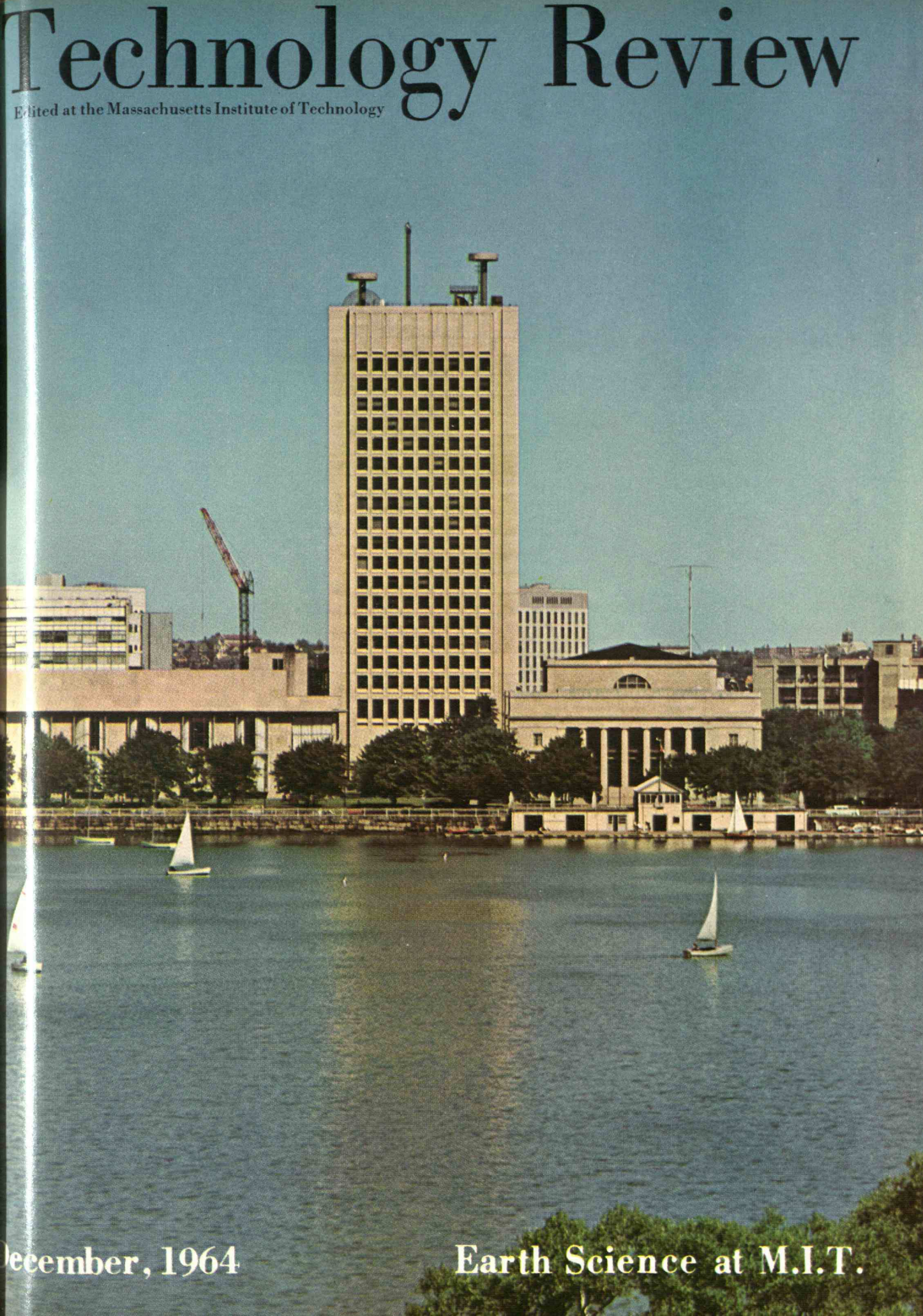
Technology Review

Edited at the Massachusetts Institute of Technology



ecember, 1964

Earth Science at M.I.T.

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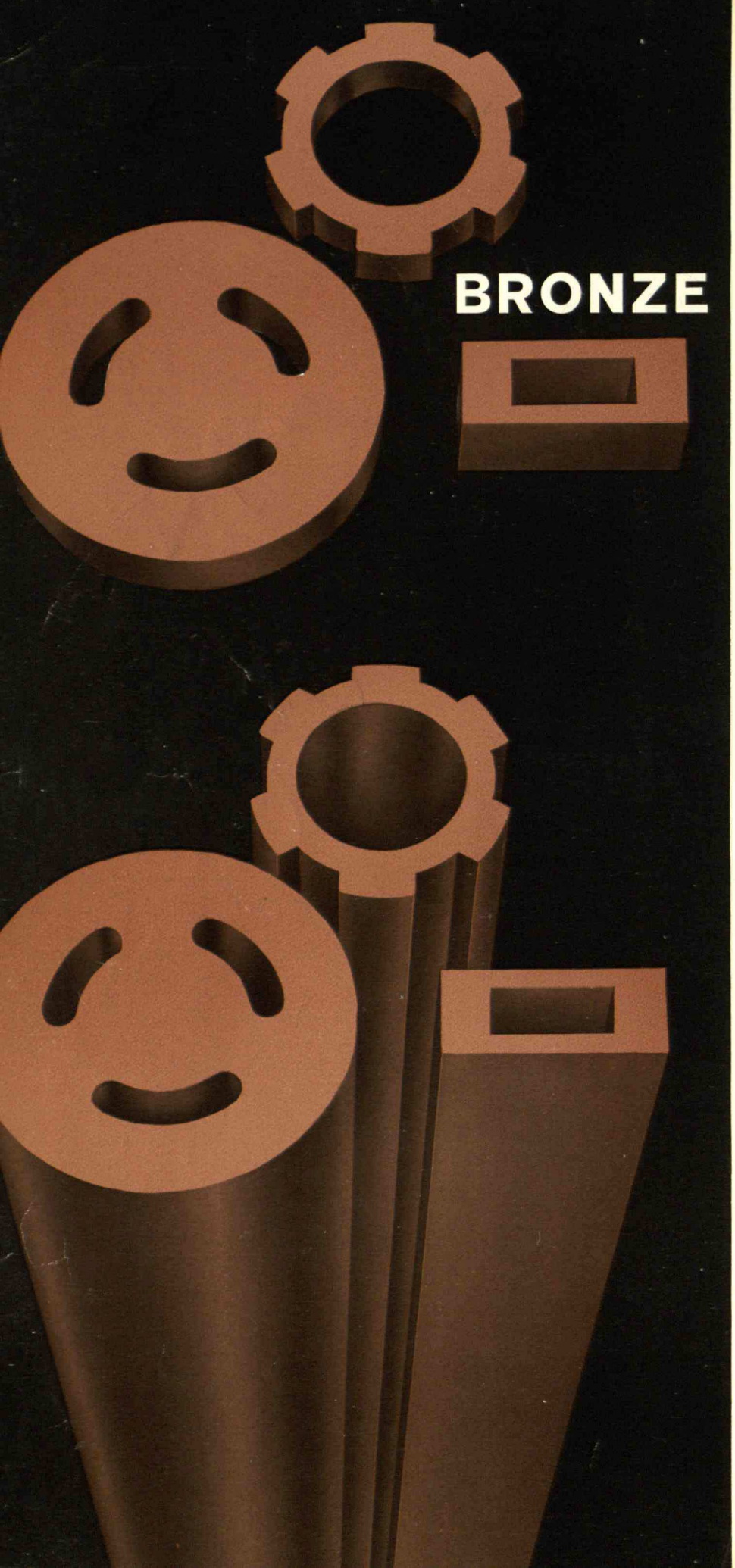
review
Published by MIT



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Recognized as a major metallurgical achievement, the patented Asarco Continuous Casting process is the only method for producing long cast bronze shapes close to finished dimensions.

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Consider this comparison: Use an *individual* casting for each bronze part and each must be machined, one at a time. But use a long Asarcon® shape and you can machine it on automatic screw machines or other high speed equipment.

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And even the die saves you money. In continuous casting bronze shapes, Asarco uses graphite dies: the cost is low, usually less than $100!

Users of Asarcon bronze report no rejects due to metal flaws: the patented Asarco Continuous Casting process makes it *virtually impossible* for Asarcon bronze to be cast with porosity, shrinks, inclusions, hard or soft spots.

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AMERICAN SMELTING AND REFINING COMPANY

ASARCO

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Could a U.S. firm that helped save a cotton crop abroad also have a hand in keeping Jayne Tippman's skin soft?

You'd expect that a U.S. company engaged in mining, production and marketing in over a hundred countries might have an impact on many national economies. And you'd be right. For instance, with an insecticide sold under the trade mark "Sevin," this company was largely responsible for saving a middle east cotton crop.

And when a leading chemical manufacturer's products include silicones, which have a soothing and protective effect on skin, they're bound to turn up in skin lotions, creams, and emollients. Jayne Tippman uses them to keep a glowing complexion that weather can't beat.

Cotton fields and skin lotions are unlikely markets for one company's products. Unless that company is Union Carbide.

But then, Union Carbide also makes half a dozen major plastics, along with plastic bottles and packaging films. And it's one of the world's most diversified private enterprises in the field of atomic energy. Among its consumer products are "Eveready" batteries and "Prestone" anti-freeze. Its carbon products include the largest graphite cylinders ever formed, for possible use in solid-fuel rockets. Its gases, liquefied through cryogenics—the science of supercold—include liquid oxygen and hydrogen that will be used to propel the space ships designed to reach the moon.

In fact, few other corporations are so deeply involved in so many different skills and activities that will affect the technical and production capabilities of our next century.

It's a future that glows like Jayne Tippman.

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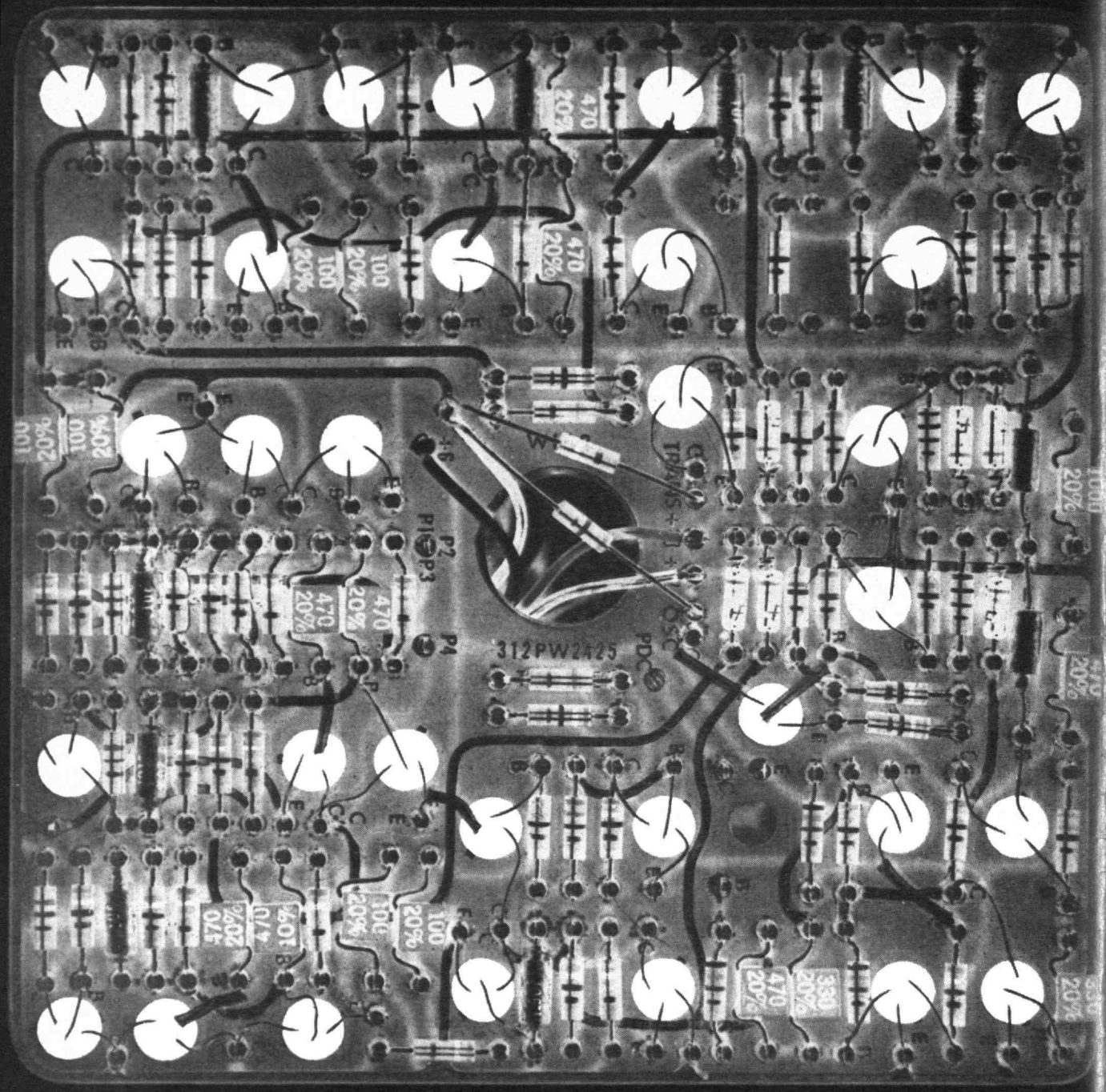
Spacecraft Logic Unit



The Lincoln Laboratory, a research center of the Massachusetts Institute of Technology, is engaged in theoretical and experimental investigations in advanced electronics, with emphasis on technological applications to national defense and space exploration. The program in *Space Communications* is directed toward the discovery and development of methods for long distance communication resistant to disruption by natural or man-made disturbances. All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin. Lincoln Laboratory, Massachusetts Institute of Technology, Box 28, Lexington 73, Mass.

Solid State Physics
Information Processing
Radio Physics and Astronomy
Radar Design
Control Systems
Space Surveillance Techniques
Re-entry Physics
Space Communications

A description of the Laboratory's work will be sent upon request.

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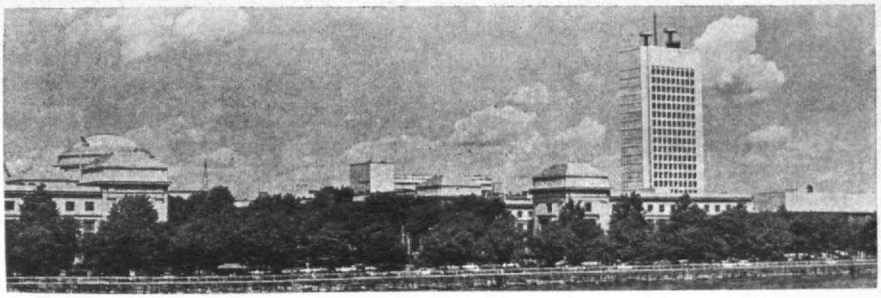
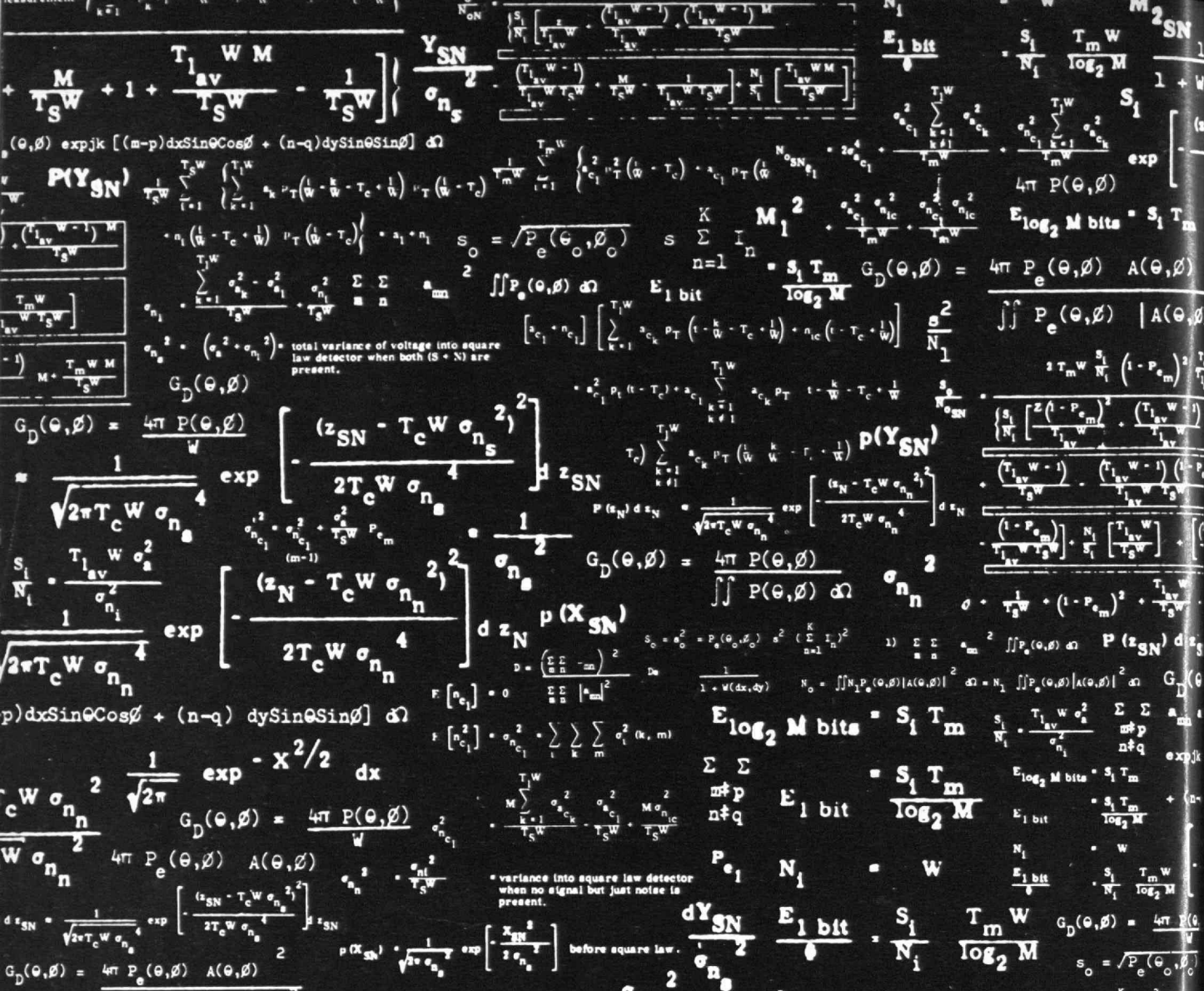


Earth Science at M.I.T.

THIS MONTH, *The Review stresses the significance of the New Center for Earth Sciences housed in the Cecil and Ida Green Building that is pictured on the cover and in the photograph above.*

News of the M.I.T. Community

Three M.I.T. Alumni Seminar Papers



The computer almost cried "uncle."

The programming involved 10,000,000,000 separate calculations.

It was so massive it had to be broken into two stages before the computer could even begin to handle it.

That's how thoroughly Martin Company documented the design of a new random access discrete address radiotelephone system.

It took into account all the possible variables in battlefield communications: deployment, terrain, communications traffic, propagation factors, modulation techniques and pulse shapes including multipath effects—then matched them against more than a dozen possible communications systems in terms of cost, band-width and communications effectiveness.

It was worth it.

The result: Martin has come up with the first truly modern battlefield communications system—offering direct automatic dialing, freedom from directory problems, coexistence with conventional systems, spectrum savings, mobility and survivability.

Laboratory and field tests with actual hardware have confirmed the calculations—and the actual design.

This is one more example of the Martin design approach: start with realistic engineering freedom—then back it with the most advanced engineering tools available today.

It pays off in results.

MARTIN MARTIN MARIETTA

At Martin, systems management means the best possible product in the shortest possible time at the lowest possible cost

Individuals Noteworthy

The Nobel Prize for Physics Comes to M.I.T.'s Provost

A CABLE from Stockholm last October 29 to Provost Charles H. Townes of M.I.T. notified him:

Royal Academy of Science today awarded you one half of the 1964 Nobel Prize for Physics. The other half to be shared equally by Basov and Prokhorov all for fundamental work in quantum electronics leading to production of oscillators and amplifiers on maser-laser principle. Our warm congratulations. . . .

Erik Rudberg
The Permanent Secretary

Dr. Townes, who was in Pasadena at the Jet Propulsion Laboratory that morning, promptly wired "warmest congratulations" to Professors N. G. Basov and A. M. Prokhorov at the Lebedev Physical Institute, Academy of Sciences of the U.S.S.R., in Moscow, and added that he looked forward with pleasure "to the occasion together in Stockholm."

Dr. Townes conceived the idea for the maser in 1951, while attending a meeting of physicists in Washington. A chief objective of scientists then working in radar and microwaves was shorter microwaves, and Dr. Townes reflected: Why not produce shorter microwaves by controlled molecular or atomic activity? Many people told him the idea would not work, but he went ahead with it with his associates at Columbia University, and it did work. Masers and lasers have made a new range of basic research possible and many scientists expect them to lead to numerous new devices, discoveries, and inventions. Dr. Townes has continued through the years to be a pioneer in the field.

He was born in Greenville, S.C., in 1915 and was graduated from Furman University there when only 19. He obtained his master's degree from Duke University and his doctorate at the California Institute of Technology. After several years at the Bell Telephone Laboratories, he was appointed to the Columbia University faculty and began the work there for which he has now been honored.

He came to M.I.T. as Provost in 1961, and now shares responsibility with President Julius A. Stratton, '23, for general supervision of the Institute's research and educational programs.

Photo from Boston Record American

Three daughters, Mrs. Townes, and an enthusiastic M.I.T. delegation greeted the Provost at Boston airport on October 31.

("Individuals Noteworthy" is continued on the next page)

Individuals Noteworthy

(Continued from page 5)

Carnegie's President

PROFESSOR H. Guyford Stever of M.I.T. will become president of the Carnegie Institute of Technology on February 1.

Professor Stever came to M.I.T. in 1941 as a member of the staff of the Radiation Laboratory. He left to serve the Office of Scientific Research and Development in London, but returned in 1946 as assistant professor. He became professor of aeronautics and astronautics in 1956, was associate dean of the School of Engineering from 1956 to 1959, and more recently has headed both the Department of Mechanical Engineering and the Department of Naval Architecture and Marine Engineering.

He has also served as chief scientist of the U.S. Air Force and in other important posts. In Pittsburgh, he will succeed J. C. Warner, who is retiring.

Douglas McGregor: 1906-1964

ONE OF the nation's leading authorities on human organization, Professor Douglas M. McGregor died on October 13 after a heart attack.

Dr. McGregor came to M.I.T. in 1937 as an instructor in the Department of Economics and Social Science, rose to the rank of professor, and founded and directed the Industrial Relations Section. He left the Institute in 1948 to become president of Antioch College in Yellow Springs, Ohio, but returned in 1954 as Professor of Industrial Management, and was appointed to the Sloan Fellows Chair when it was established in 1962 by a grant from the Society of Sloan Fellows.

Born in Detroit, Dr. McGregor was graduated from Wayne University, received his doctorate at Harvard, and was an instructor in psychology at Harvard for two years.

He strove in his research to increase understanding of human motivation, and believed that organizations could be made more effective by providing their members with broad opportunities for self-development and self-direction. He summed up much of his philosophy in 1960 in his book *The Human Side of Enterprise*.

During World War II, he was director of Industrial Relations for Dewey & Almy Chemical Company, served the Department of Labor as an analyst of the New England labor supply, studied the longshore and maritime industries for the U.S. Army, and acted as an arbitrator.

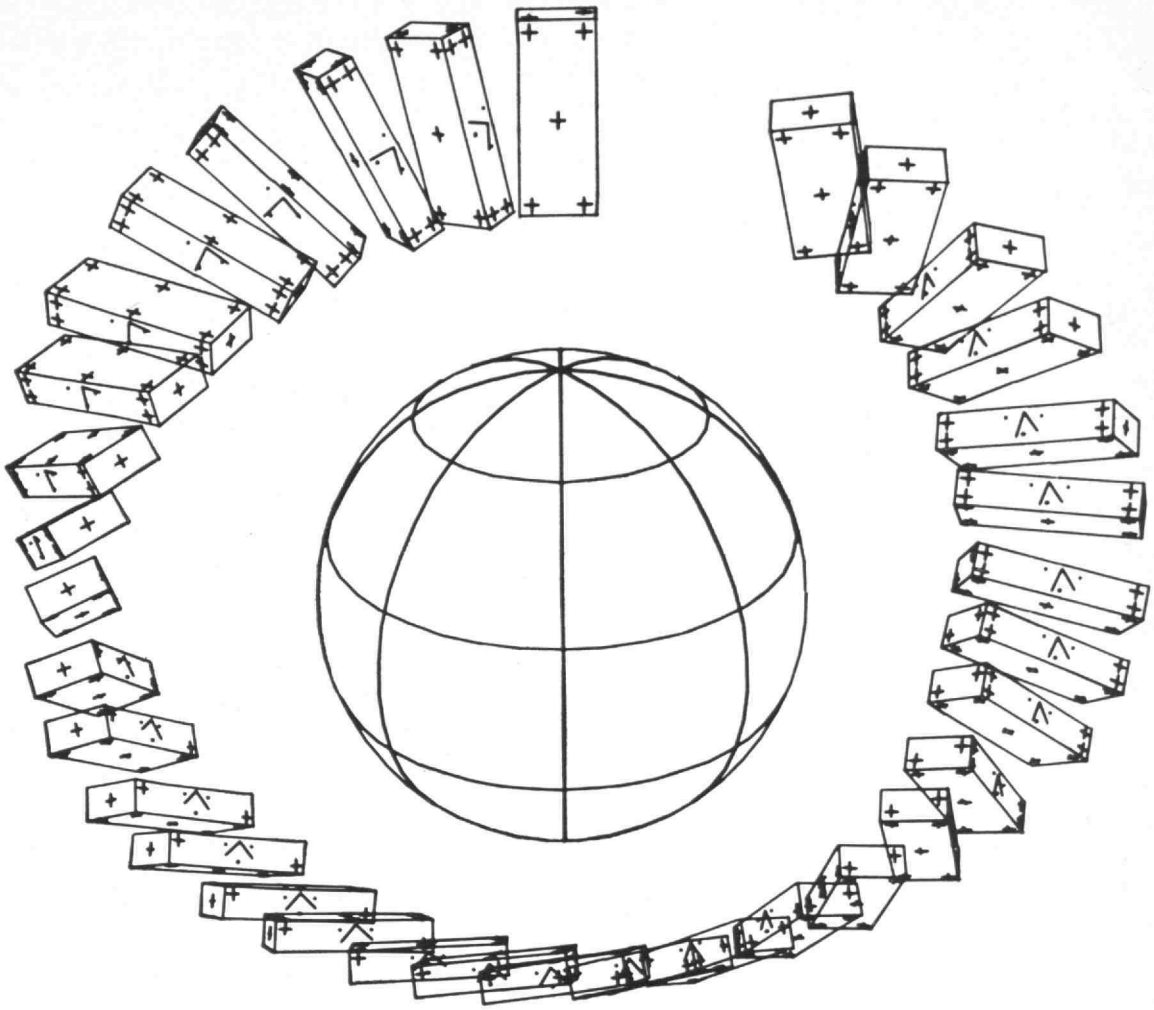
He was a member of the board of the Foundation for Research in Human Behavior, an associate of the National Training Laboratories for Group Development, a Fellow of the American Academy of Arts and Sciences, a trustee of Antioch College, and a member of the American Psychological Association, Phi Beta Kappa, and Sigma Xi.

He is survived by his wife, two children, his father, and a brother.

Bertha Wiener: 1868-1964

THE LATE Professor Norbert Wiener's mother, Mrs. Bertha Wiener, died October 28 at the home of her son-in-law, Professor Philip Franklin, at the age of 96.

(Continued on page 8)



Picture of a satellite in orbit—as drawn by a computer

The domino-shaped box in the drawing above represents a communications satellite orbiting the earth.

The various angles and positions of the box show the relative positions of the satellite during one orbit.

The drawing was made, not by a man, but by a computer at Bell Telephone Laboratories to help scientists visualize how the satellite would behave.

What the computer did is called *simulation*. Working from data given it, the computer calculated, or simulated, the satellite's position at various instants and produced the picture on microfilm. The picture told us what we needed to know.

We use such simulation a great deal to save time and hold down costs in developing and testing new products and services.

Computers help us plan coast-to-coast transmission systems, new switching logic, and data systems. They also help us study problems relating to telephone usage at given times of the day or year.

Not all of our simulation is done on computers. Often we can simulate by other means.

We test new kinds of undersea telephone cables in buried, brine-filled steel pipes that duplicate the pressures and temperatures of the ocean's bottom at various depths.

Ingenious equipment in one of our laboratories sends test telephone pulses racing around an electronic ring that simulates a 6000-mile circuit containing 5300 repeaters to boost voice volume.

Many additional examples of simulation could be cited. Often they help us spend our time and money more efficiently in developing new services and improving present ones—in making sure that America continues to enjoy the world's finest telephone service at the fairest possible prices.

Individuals Noteworthy

(Continued from page 6)

Faculty News

JAMES R. KILLIAN, JR., '26, Chairman of the Corporation, was scheduled to address the American Society of Mechanical Engineers banquet in New York in December, and Professor Jacob P. Den Hartog was among those on whom honorary membership was to be conferred.

President *Julius A. Stratton, '23,* was made an eminent member of Eta Kappa Nu, national electrical engineering society, in November.

Professor *John C. Sheehan* was given the 1964 John Scott Award "for inventions of the total synthesis of penicillin and certain analogues of penicillin" at the meeting of the American Society for Microbiology in New York.

Eric Reissner, '38, Professor of Mathematics, was chosen by the American Society of Civil Engineers to receive the Theodore von Kármán Medal.

Professor *Robert S. Harris, '28,* was invited to address the Grocery Manufacturers of America food forum in New York on "Nutrition Science."

Associate Professor *John W. Winchester, '55,* was a lecturer in a special course in laboratory methods of nuclear geology at the Oak Ridge Institute of Nuclear Studies in October.

Associate Professor *Kurt S. Lion* will participate in a Measurement Engineering Short Course planned by Professor *Peter K. Stein, '49,* at Arizona State University in February.

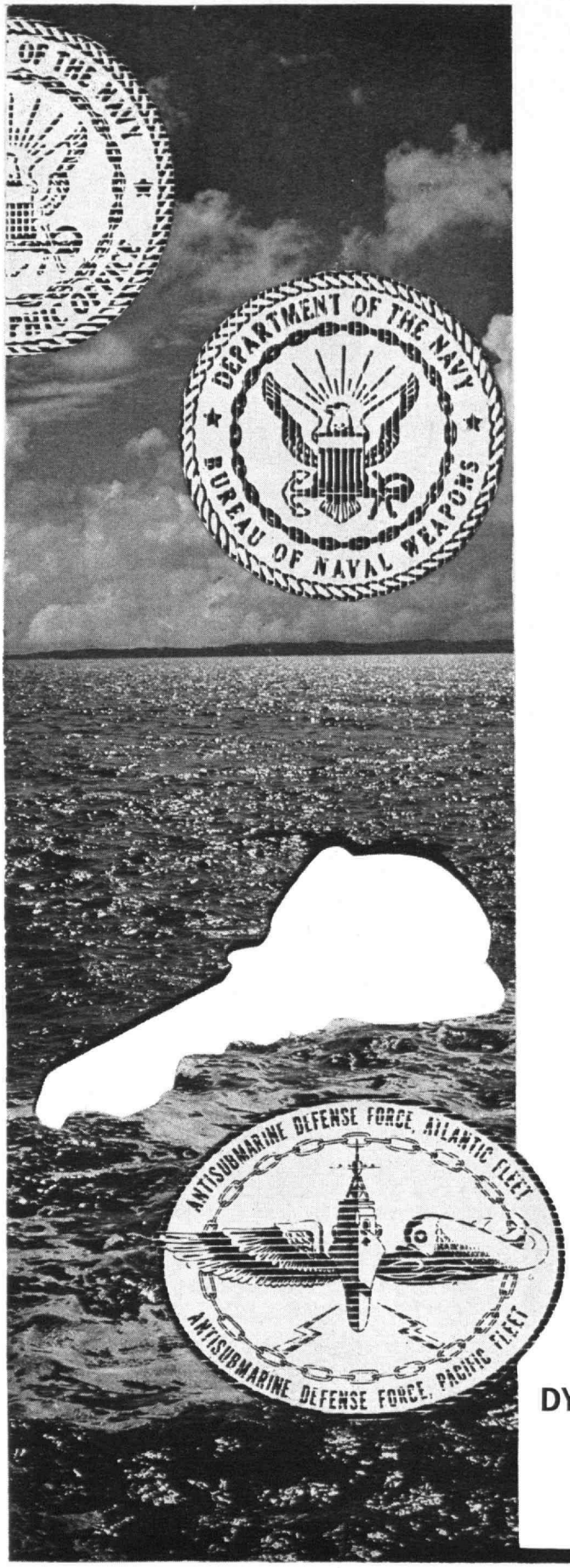
Provost *Charles H. Townes* was the keynoter at the Instrument-Automation Conference in New York in October, and Professors *Jerome Catz, '54,* and *Kurt S. Lion* spoke in technical sessions.

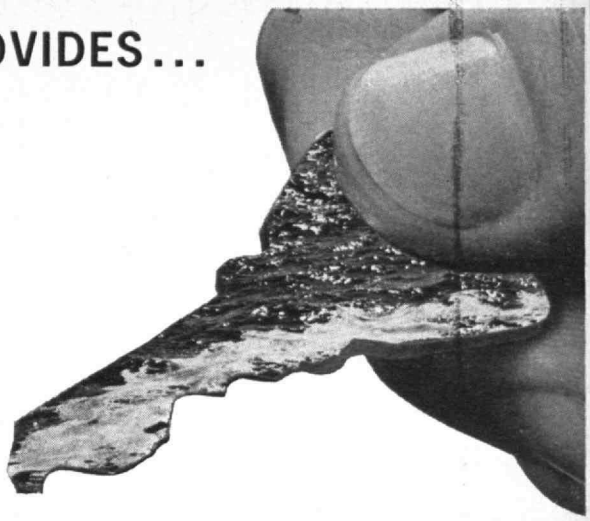
Compton Court

TO HONOR three brothers, Karl Taylor Compton, Wilson Martindale Compton, and Arthur Holly Compton, Princeton University has named a new Graduate School Quadrangle the "Compton Court." Karl T. Compton was president of M.I.T. from 1930 to 1949, and Mrs. Karl T. Compton was present for the ceremonies.

(Continued on page 10)

MASSA DIVISION PROVIDES...





A KEY TO ADVANCED SONAR CAPABILITIES

Massa Division has been engaged through contract and proprietary efforts with the various branches of the Department of Defense. Through its qualified engineering personnel, Massa offers an unexcelled knowledge of all types of transducer materials and designs, placing a great deal of emphasis on the quality of its products.

The established specialized acoustic facilities and capabilities at Massa Division are a result of the accumulated knowledge of the engineering personnel. Future co-operation with the Department of Defense will result in the continuous design and manufacture of all types of transmitting and receiving transducers for use in many sonar applications.

Write for new "Advanced Sonar Capabilities" brochure

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Individuals Noteworthy

(Continued from page 8)

Earth Science Teachers

APPOINTED to the Faculty of the M.I.T. Department of Geology and Geophysics this year were:

Anthony F. Gangi, Associate Professor of Geophysics, who after receiving three degrees from the University of California (Los Angeles) concentrated on seismic modeling experiments for several years in the UCLA Institute of Geophysics.

William C. Luth, Assistant Professor of Geochemistry, who is completing an appointment as research associate at Pennsylvania State University. He received his doctorate there in 1963, and is also an alumnus of the State University of Iowa.

Lee W. Dean, 3d, '56, Assistant Professor of Geophysics, who was graduated *cum laude* in physics from Amherst College before coming to M.I.T. for three degrees, and who has been an instructor in physics since 1960.

David W. Strangway, Assistant Professor of Geophysics, who received three degrees at the University of Toronto, and has taught at the University of Colorado.

M. Nafi Toksoz, Assistant Professor of Geophysics, who is a native of Turkey educated at the Colorado School of Mines and the California Institute of Technology, and has been a field and research geophysicist for the Socony Mobil Oil Company, and a fellow at Caltech.

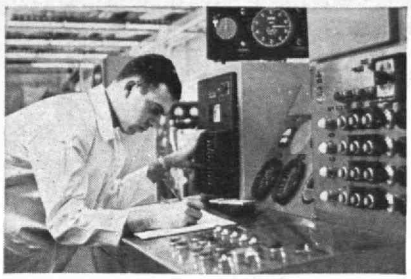
Estate Secretary

D. HUGH DARDEN, until recently Director of the Educational Council and Associate Director of Admissions, has succeeded *John W. Sheetz, 3d, '42,* as Institute Estate Secretary. This position has been made the focal point of an intensified effort to augment M.I.T.'s endowment and other long-term capital resources, and Mr. Darden will be responsible for planning and developing a program of bequests, life income trusts, insurance plans, and other forms of major deferred giving. He will work closely with the Office of Vice-president and Treasurer and with the Alumni Association.

Mr. Darden came to M.I.T. in 1957 as Executive Secretary of the Educational Council and Assistant Director of Admissions.

(Continued on page 41)

In a space suit, Edward J. Keating, '58, of Grumman Aircraft, explained the lunar landing craft to Alan D. Stankiewicz, '68, and his father, at a Long Island alumni meeting.



Shhh! **Enginuity at work!**

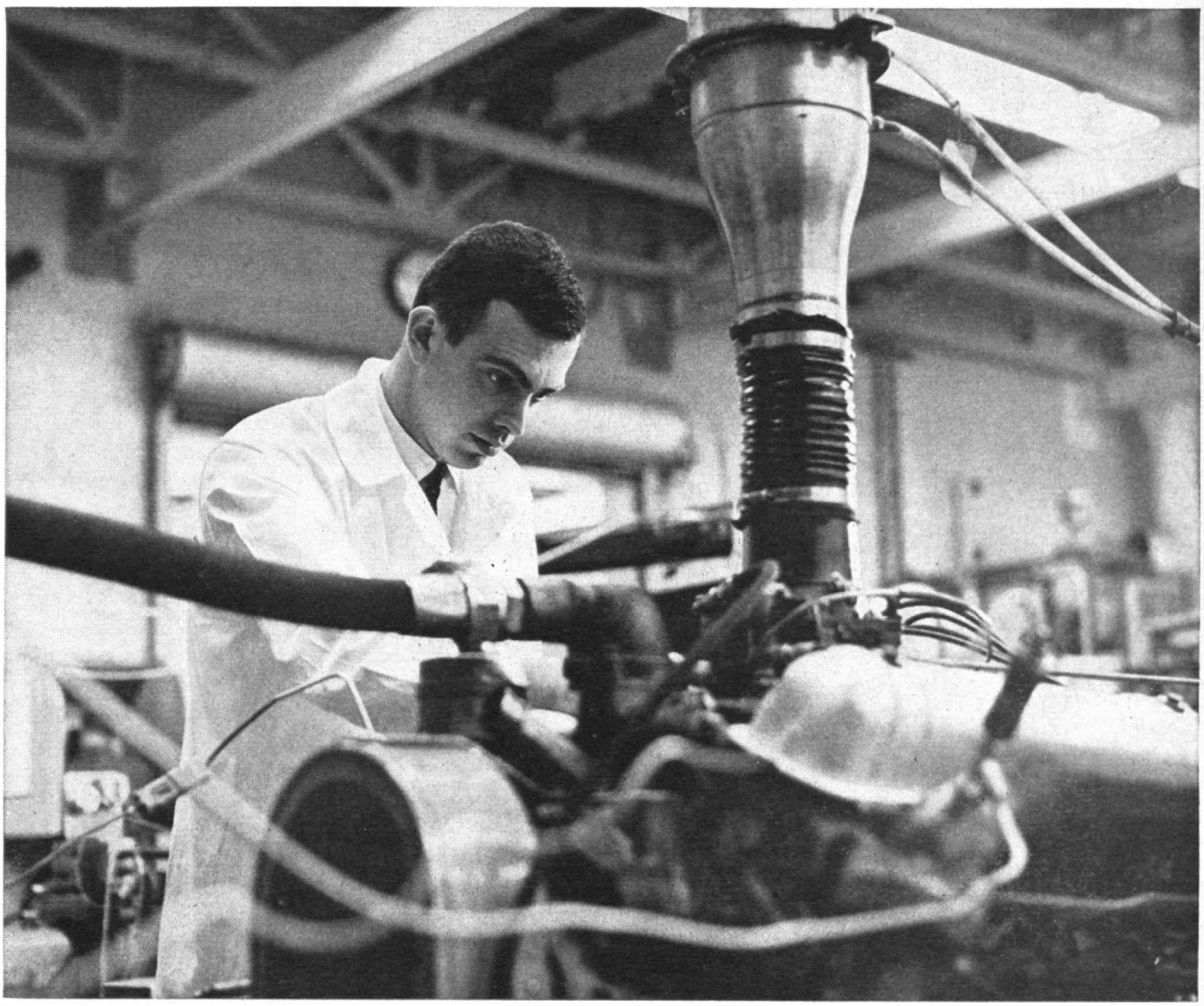
That's Bill Emrich immersed in his work behind that Lincoln engine. He's testing new oil additive formulations, designed to make new engines produce to their potential. Yet, whatever he develops has to meet the needs of older engine models, too. You might say it's a matter of enginuity.

Bill uses several test engines: among these are a Labeco one-cylinder, a Caterpillar one-cylinder and special Lincoln and Oldsmobile engines. He tests oil additives and formulations for sludge, rust, wear and reaction to high-temperatures under severe operating conditions. His findings will help car owners to get greater mileage between oil changes, longer engine life. A most important project. Yet, Bill is only 24 years old. Just last year, he came to American Oil and is now working for Amoco Chemicals, a sister company. Bill graduated from the University of Illinois with a B.S. degree in mechanical engineering.

The need for young professional people in positions of responsibility and creativity is great. Bill happens to be an automotive engineer, but he still might be working for us had he chosen a different field—mathematics, physics, chemistry. A variety of opportunities exist here at American Oil Company.

For information, write to J. H. Strange, American Oil Company, P.O. Box 431, Whiting, Indiana.

AMERICAN OIL COMPANY AMERICAN



Given: THE EARTH

The world needs investigators who delight in understanding the natural environment of man

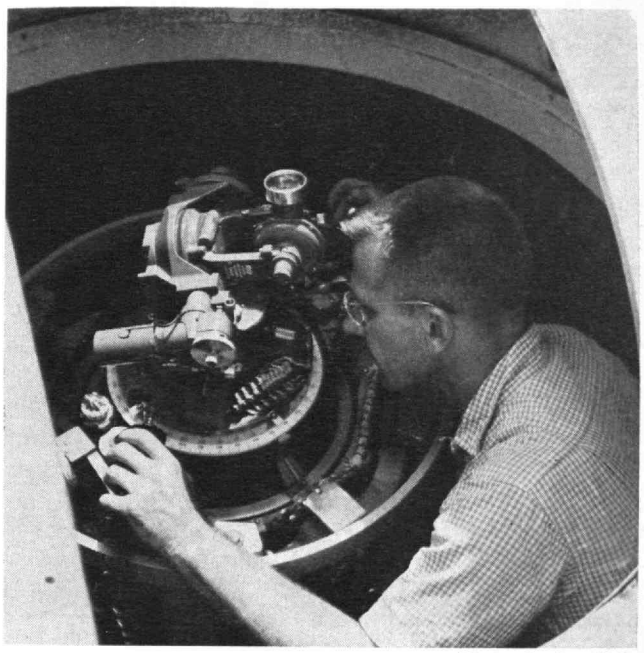
By William S. Von Arx, '55
Professor of Physical Oceanography

THE PROBLEM facing earth scientists is an enormous one, difficult to appreciate in its entirety, because the earth is so big and men are so small. But, with the advent of satellite reconnaissance, radio telemetry, and networks of automatic observing stations, man can, for the first time, sense indirectly some aspects of the earth as a whole and thus be in a position to test against reality the validity of his conceptions of the earth's properties and behavior.

As little as two generations ago, the geologists, meteorologists, and occasional oceanographers abroad were primarily engaged in describing the earth. Their inquiries were mainly confined to the firm surface of the land, the lower atmosphere, and shallower waters. The present generation is striving to reach the limits of each phase of our environment.

Men are beginning to penetrate the solid earth not only on dry land but beneath the ocean floor. The atmosphere is being populated routinely to heights of several miles and explorations into the near vacuum of space are now entirely feasible. Oceanographers are no longer a rare breed. Increasing numbers of them are pushing forward systematically across the entire world ocean and are even beginning to enter its depths. Oceanography, once often the avocation of wealthy men, has become a recognized scientific profession. Meteorology, once primarily motivated by the needs of men to know tomorrow's weather, has developed almost disciplinary characteristics as a science. Geology, once mainly concerned with the problems of describing sedimentary sequences, igneous structures, and the morphology of mountains and rivers, is now concerning itself with the ages and origins of crustal materials and their relationships to the underlying mantle.

The methods of physics, chemistry, and applied mathematics have shed new light on the relationships of surface solids, liquids, and gases to those in the interior of the earth. Fluid mechanics provides the central theme of argument concerning a modern physical explanation of



Photos by Jan Hahn

Aboard an oceanographic research vessel, Professor von Arx adjusts the navigation instrument he has developed.

the magnetic field of the earth. The lines of magnetic flux originating in or around the core of the earth extend outward into space to influence the behavior of plasmas associated with the outer reaches of both the terrestrial and solar atmospheres.

Balances

The sun is important to the earth not only because it makes the earth habitable but because it provides most of the energy that produces wind, rain, and ocean currents. The mean temperature of the earth is fixed by the balance of incoming and outgoing radiation. We now know from the evidence provided by satellites how the outgoing radiant energy from the earth is distributed in space almost as well as we have known from astronomical considerations how the incoming solar energy

is received over the earth. One of the main concerns of meteorologists and oceanographers today is to find the physical mechanisms which allow the incoming energy of the sun to be redistributed by the motions of the seas and air to allow the outgoing radiant energy of the earth to be distributed as it is.

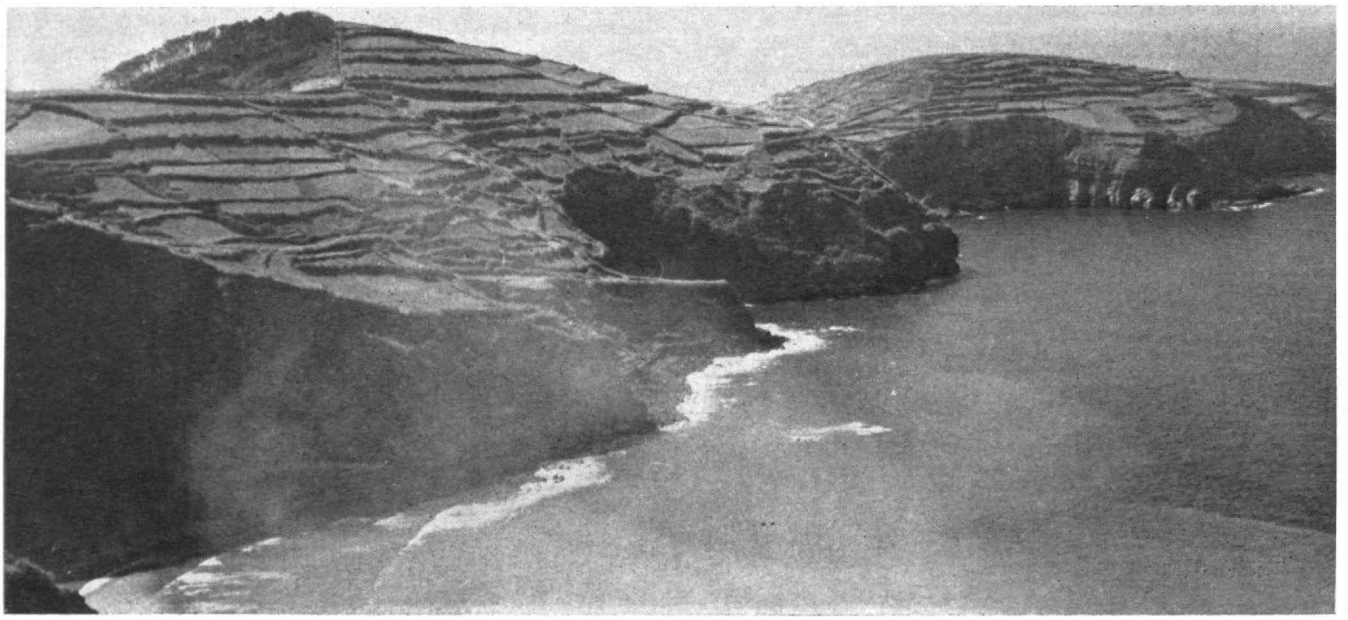
Winds and ocean currents are manifestations of these physical processes, in brief, a part of the dynamics of climate. The word turbulence is used for complex motions of fluids in all scales. It is often thought that turbulent energy cascades from the largest scales of planetary winds and currents, the so-called mean motion, down through successively smaller turbulent entities ending ultimately in molecular motion and heat. It is evident that the reverse must also occur. The molecular motion associated with the arrival of solar energy at the surface of the earth must somehow be organized to produce small-scale turbulence and these elements must in turn feed successively larger turbulent modes until the mean motion is established. Recent studies of these processes in both the oceans and atmosphere have shown that in certain scales eddies do contribute to the mean motion of the sea and air while in others the energetic cascade in turbulence is from the mean motion toward the molecular scales and heat.

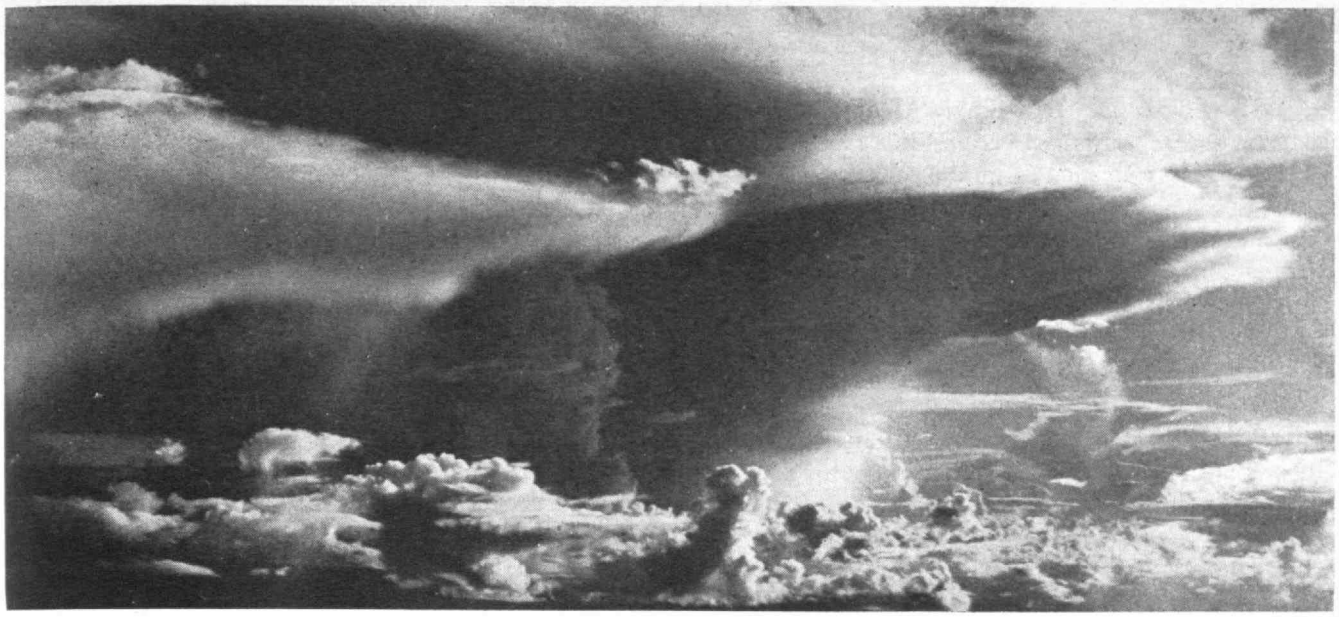
At the same time that physical investigations are taking a new cast, chemical and biological studies of the earth are also undergoing a renaissance. The origins of the salt in the sea are being discussed as well as the associated chemical equilibria that allow organic and inorganic salts to be maintained. The contributions to the atmosphere of aerosols from the land and the sea are now seen to be an integral part of the rain-making process. Clouds and rain in their turn are now known to be an efficient means of releasing heat in the atmosphere. The warm waters carried into the North Atlantic by the Gulf Stream, for example, do not directly heat Western Europe but rather humidify the winds of the lower atmosphere and thus promote fog and rainfall with such a considerable release of latent heat that the European climate becomes tolerable. Witness the severity of the weather at the same latitudes on the western side of the North Atlantic in Labrador where the Gulf Stream is nearby, but where warm moist ocean winds do not blow.

Scientific Method

In the light of these and other developments in earth science, one can see that the age of the intrepid geographic explorer is gradually ending. Emphasis today is on more deft inquiry into the physical mechanisms that are joined to produce the world as we know it. This juncture of physical processes in itself creates severe problems because the various parts of the earth interact with one another as a mutually interdependent system. Mathematical description of these physical processes more often than not involves nonlinear differential equations which are at best always difficult to solve. Similarly, experimental approaches to exploration of the earth involve the study of inseparable phenomena in which often a number of variable quantities interact with one another. This means that the system has to be studied whole. To do this one must be able to measure the distribution of relevant variables over the whole earth as a function of time and to face the consequences of having to deal with enormous masses of data.

Fortunately, in this age of orbiting sensors and telemetry certain kinds of rapid global reconnaissance are possible and computers exist which can assimilate the resulting masses of data in something short of real time. These tools provide a challenge all their own to people of an engineering turn of mind who appreciate their complexities. With new vehicles to carry sensors and with new methods of handling the data they produce, parallel challenges are offered to those skilled in the arts of instrumentation and invention. We stand in the present decade at the threshold of an era of exploration which is rather more sophisticated than that of a century ago but which requires, nevertheless, the same





kind of open-minded curiosity that characterized the work of the great naturalists of earlier times.

However one may approach the modern problems of earth science, it is necessary to maintain a childlike appreciation of new phenomena and at the same time bring to bear a full measure of scholarly skepticism in seeking a physical explanation for that which has been observed. Along with this it is necessary, in order to transcend the large difference in scale between the world of everyday life and conceptions of the whole earth, to develop and maintain both a geological perception of time and an astronomical perception of space. Armed with these characteristics the mind of man can transcend the physical discrepancy of 10-billion-billion to one between his physical bulk and that of the earth.

Education

The Center for Earth Sciences in the new Green Building at M.I.T. will bring together certain aspects of research in an educational enterprise designed to produce people of the gauge and soundness needed for the future well-being of the earth sciences. The educational recipe being followed is roughly this: Take a man (or woman) already well trained in one of the basic disciplines; expose him to the broad spectrum of ideas and problems posed by the solid earth, oceans, and atmosphere, and to the history of thought that has led to the present state of knowledge; give him his choice of research areas; and then help him deepen his understanding along the lines of that choice. Ideally each student has a small group of faculty advisers who reflect his interests as an entering student, and the membership of this group changes as he develops as an individual. In this way, each student enjoys a uniquely tailored educational experience which may never be exactly duplicated in that of another student.

Moreover, each student is at liberty to draw together for his own particular use not only the advice and instruction of the faculty of earth sciences but that of teachers of other disciplines represented at M.I.T. This highly flexible approach to education has been prompted by the belief that in true research no one can guide the coming generation better than the inner drives of its own members.

By these means students are being urged to become magnified images of themselves rather than of their professors. This program is experimental and has been in force for only a few years, but thus far there seems to be no compelling reason for altering it; except possibly that it places too severe demands upon the intellectual agility of the Institute's faculty. Gifted young people can think of the darnedest variety of valid problems!

Research

In their research activities, the people of the Center for Earth Sciences strive to break new intellectual ground rather than concern themselves with data collection. Programs now in progress have to do with such diverse questions as the contributions of eddy motions in the maintenance of the mean motions of the oceans and atmosphere; the predictability of the atmosphere and its stability in the face of small perturbations; the history of continents as revealed by the ages of rocks comprising continental masses; the origins of salt in the sea and the routes, rates, and reservoirs that influence the appearance of its constituents in the ocean after they have been released from the solid earth or as they make their way to a free existence in the atmosphere. At M.I.T. men are also studying the architecture of oceans and the dynamical processes that maintain not only the internal structure of the sea but influence the atmosphere, the structures of clouds, the mechanisms of rainfall, the origins of hurricanes, the behavior of fluid flow in the presence of rotation, the figure of the earth as determined by the earth's field of gravity, applications of modern inertial systems to the problems of astronomical navigation and geodesy at sea, methods for and assessment of the absolute field of motion in the

hydrosphere, and the influence of heat and evaporated water redistributed by these motions beneath the atmosphere.

The new discipline of geophysical fluid mechanics is common to many of these programs. For a long time, the most exciting application of fluid mechanics was in the theory of flight. Lately, there has been an explosive development of ideas concerning the physics of flow in thermal convection and vortex motions, thought to be present not only in the atmosphere and oceans of the earth and other planets but in their interiors as well.

Anticipation

Behind the sober, academic exterior of these endeavors there is an atmosphere of "Christmas morning" developed partly by the clean aspect of a lofty new building which now houses the Center for Earth Sciences, but more importantly by a sense of beginning. The Departments of Meteorology and of Geology and Geophysics were developed separately at M.I.T. but have found through the years that their members' interests in research and education were being gradually but inexorably fused by their use of the approaches of physics and mathematics to problems of the earth. The language barrier formerly presented by the differing jargon of geologists and meteorologists was removed by the common parlance of mathematics, physics, and chemistry. Thus, people not only found themselves able to talk to each other across departmental barriers but discovered areas of common interest.

Finding that the principles of theoretical physics and chemistry have equal relevance to problems of the solid earth and atmosphere not only made it possible for people to speak understandably but also to realize that something was missing. The oceans were being neglected. Through an arrangement with the Woods Hole Oceanographic Institution, a part-time faculty was gathered to represent the marine aspects of earth science. This led to the appointment of a few full-time oceanographers in both departments. Since oceanographers are seldom stay-at-home scientists, it is now commonplace for both teachers and students of the earth sciences to have their mail forwarded to addresses half way around the world. How extensive this new tendency will be for M.I.T. people to be out and doing across the oceans and into space, we cannot say, but the precedent for such behavior is now firmly established. Through this practice, M.I.T. students may develop not only greater awareness of the earth than can be acquired in a classroom, but also, through experience, the ability to handle themselves and make meaningful observations when face to face with nature.

Natural Colleagues

Much of the equipment in present use by research workers in the earth sciences has been developed on a do-it-yourself basis. At M.I.T. there is an enormous resource of engineering competence that one may hope can be attracted to the operational aspects of studying the earth. Since the solid earth, oceans, and atmosphere are fields in which disciplinary inquiry can be applied, it does no violence to precedent to include engineers among the physicists, chemists, biologists, and mathematicians who now call themselves earth scientists.

Nor need one stretch one's imagination to foresee a day when economists, lawyers, anthropologists, and other specialists in human affairs will join the physical scientists and engineers in studies of the earth because of the pressures of increasing world population. The applied aspects of earth science, such as control of pollution and effective utilization of the resources of the planet, will enable mankind to survive with a generally decent standard of living and nutrition. Pressures to expand the scope of the earth sciences to include the life sciences are already being felt.

Public Responsibility

As science and technology buffet us with new things, methods and procedures to get used to and with a sense that the world is shrinking beneath our feet, ordinary people tend to become increasingly apprehensive. New steps are often difficult for every man to follow. Educated men, who are largely responsible for these changes, must shoulder responsibility for the social consequences of their deeds. Necessarily then, the well-trained scientist or engineer must balance his specialized knowledge and ambitions with a sense of history.

Awareness of this aspect of educational responsibility has been growing at M.I.T. for many years with the result that the Schools of Science and of Engineering are being firmly supported by an increasing emphasis on the humanities. This emphasis is favorable also to the development of young men sufficiently well rounded to become naturalists in keeping with the best traditions and yet so soundly trained in the basic disciplines that their interpretations of natural phenomena are easily connected with the established structure of human knowledge.

The view of the earth sciences developed here has deep-rooted origins and the same element of endlessness that the earth itself possesses. In 1725 Count Luigi Ferdinando Marsigli published a monograph of the natural history of the seas which consisted of five parts: the bottom topography of the sea, the waters of the sea, the motions of the waters, plants in the sea, and animals of the sea. He reported measurements of the tides and seasonal temperature changes of the air and of the water to depths as great as 120 fathoms. At the end he drew certain conclusions among which he stated, in effect: "Research into the nature of the sea is very difficult, and this perhaps has been the reason why many learned men—because they could not see an end to such an undertaking—are of the opinion that it is useless to make a beginning." But Marsigli and others did make a beginning, and now many men feel that it would be a very dull world if an end ever should come into sight.

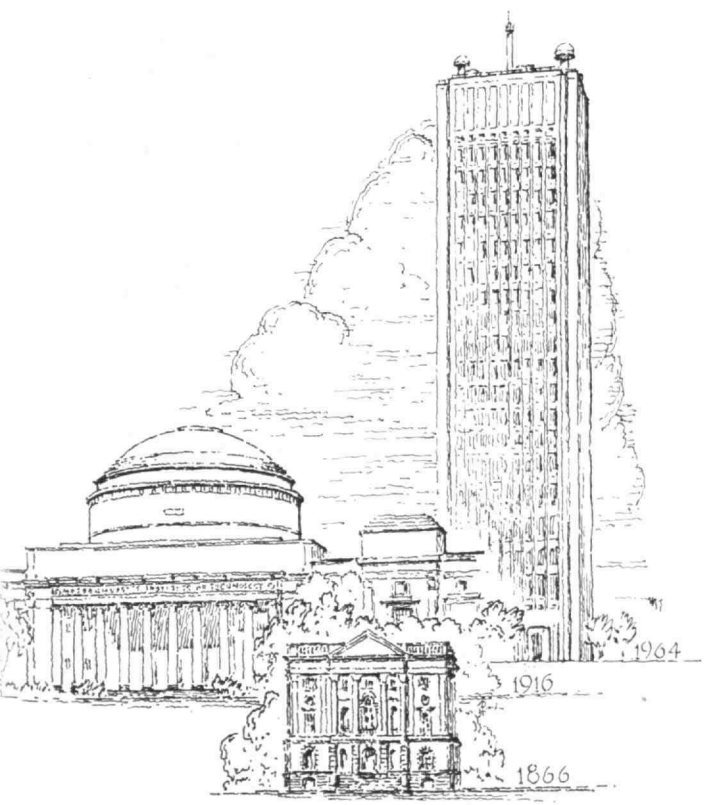
The Highest Tower In Cambridge

This frankly functional new building symbolizes the unity of sciences concerned with the earth

THE 277-FOOT-TALL Cecil and Ida Green Building, now occupied by the M.I.T. Center for Earth Sciences, is the highest structure in Cambridge. Between the two-story arcade at ground level and the meteorological laboratory on its roof, there are 20 floors. The building is 111 feet long and 54 feet wide, and has no interior columns, because the exterior walls are load bearing.

It stands on 392 concrete-filled piles, 12 inches in diameter, averaging 120 feet in depth. On its roof are radar platforms, a balloon shed, and other facilities for the study of the atmosphere. Thus it is a concrete symbol of the bringing together in a new center of scientists whose interests extend from the earth's interior to the sky above.

The builders poured the exposed concrete in place by using precision forms made of plastic reinforced with glass fibers, and fitted the windows on the north and south façades directly into the concrete without metal framing. The concrete was prepared to match the limestone of older M.I.T. buildings and the surface was sandblasted to insure uniform coloring.



The window glass is bronze-colored and glare-reducing. Columns on the window walls are nine feet apart, and a deep indentation and blank wall at each end show the location of the service rooms, stairs, and elevators. The two-story Eugene McDermott lecture hall on the raised first floor has taller windows than those of the Lindgren Library and the Schwarz Memorial Map Room on the second floor, and the classrooms, laboratories, and offices on the other 18 floors. Concrete panels at the penthouse level conceal mechanical rooms.

Three high-speed elevators serve the floors above the glass-enclosed entries. The lecture hall has 294 seats, the library has space for 20,000 books, and the building adds 73,500 net square feet to the Institute's floor space. A clear interior span 93 feet long and 48 feet wide permits each floor to be adapted to a variety of uses.

Frank functionalism is as evident within the building as outside it. Exposed concrete transverse I beams span the interior, and have openings for utility lines. Fluorescent lights are suspended at right angles from these beams.

Such a tall, slender building was chosen, according to its architect, I. M. Pei, '40, to provide a focal point for Eastman Court on M.I.T.'s East Campus, to fit in with the master plan for the campus, and to make more intensive use of valuable land. A paved plaza surrounds the tower and extends through the portico, and a grass mall sets off the building to the south and melds with the Eastman Court grass.

"Sculpted into shapes delineated by light and shadow, and constructed with the most advanced techniques, the building testifies to the eloquent power of a truly modest material," says Mr. Pei's partner, Aldo Cossutta.

At its dedication, President Julius A. Stratton, '23, quoted a letter from a sophomore to Dean of Residence Frederick G. Fassett, Jr., which called the building "uncommonly beautiful" when illuminated at night "with its toes touching its reflection in the misty millpond," and concluded with the promise: "We'll show Boston that M.I.T. can be beautiful!"

The building contract was held by the Turner Construction Company; engineers were Severud, Elstad, Krueger Associates; Syska & Hennessy, Inc., and Mueser, Rutledge, Wentworth & Johnston; and consultants included O'Neill Ford; Sasaki, Walker & Associates, Inc., and Bolt, Beranek and Newman, Inc.

Man and His Planet—Earth

M.I.T.'s Center symbolizes man's success in developing new resources from abstract ideas

By L. V. Berkner
President, Graduate Research Center of the Southwest

THIS ARTICLE was drawn from the author's address at an M.I.T. dinner commemorating the dedication of the Cecil and Ida Green Building. Dr. Berkner seized the occasion both to trace the development of the earth sciences and to stress the achievements of Mr. and Mrs. Green, the donors of the new building.

WE ARE here to celebrate the founding of one of the first really complete schools of earth science at any American university, or indeed anywhere. Of course, the sciences of the earth were foremost in man's mind from the earliest days, as one is reminded from Aristotle's *Meteorologica*. But in the absence of a basic organized knowledge of physics, chemistry, and mathematics, the Greek, Roman, and Arabic development of earth science was rather superficial. As the basic tools of science were molded and perfected in the Sixteenth, Seventeeth and Eighteenth centuries, a more scientific interest in our planet was revived. Lavoisier, before he lost his head in the French Revolution, formed the first weather network at the turn of the Nineteenth Century, coincident with an explosion of interest in geology symbolized by the formation of the Royal Geological Society. Forbes introduced the first seismometer in 1840, and von Humboldt made the first systematic geomagnetic surveys scarcely a century ago. The extraordinary structure of our outer atmosphere was unsuspected until the advent of radio, and the geodetic features of the earth remained a mystery until the mathematics of Clairaut.

In this resurgence of scientific interest in Planet Earth through the Nineteenth and early Twentieth centuries, each of the earth sciences developed as relatively independent studies, both in the university and in the field. On one hand, the newly found instrumentation was rather primitive, specialized, and restricted. On the other hand those few observations available were quickly applied to improvement of man's adaptation to his environment, forcing each earth science into rather empirical molds. The organization of the International Association of Geodesy in 1863, of meteorology in the 1870's, of seismology, of volcanology, of geomagnetism, and so on were quite independent, and tell the story of the lack of apparent relation at the time of their origins.

But with the powerful contemporary tools of physics, chemistry, biology, and mathematics in our century the situation has suddenly changed. The thread of waves runs through all aspects of man's environment—radio waves, light waves both soft and hard, seismic waves, ocean waves, atmospheric and shock waves, waves in the solar wind, and so on. The physics of waves provides powerful means to explore the earth from its deep interior to the outer reaches of its atmosphere.

The remarkable development of the wave-mechanics provides us with whole new chemical opportunities ranging from the photochemistry of the outer atmosphere to the geochemistry of the earth's interior.

The physics of fields permeates geomagnetism, geodesy and gravitation, and atmospheric electricity.

Likewise the physics of particles has given the earth sciences a new cohesion. We have the radioactive clocks of geochronology, the cosmic-ray particles whose energy, intensity and isotropy describe our exterior environment, the hard and the softer particles from the sun that form the complex solar wind and produce a whole spectrum of effects in our outer and inner atmosphere, and bear directly on the nature of the coupling of our earth to outer space at the magnetosphere as it courses in its orbit around the sun.

Above all, the emergence of electronics in this century has given us sophisticated sensors—the means of measurement of the complex phenomena involving our earth. This advanced instrumentation has become relatively similar among many aspects of the sciences of the earth.

And finally, as the earth sciences advanced, the theoretical relationship of one earth science to another became apparent. The ocean currents affected climate and weather, meteorology was tied to hydrology and to sedimentation in geology, indeed a hundred interrelations became evident. As early as the end of World War I, seven international associations, formed independently in different areas of earth science, joined to form the International Union of Geodesy and Geophysics, to reflect this growing interrelation.

Not until the mid-century had these forces grown sufficiently powerful to consider the organization of the earth sciences together at the university level. Then, quite suddenly, focused by the growth of our knowledge of waves, fields, and particles, by the emergence of the extraordinary instruments of our time, and by the enlarging theoretical interrelations, we find the


Roof Laboratory For Meteorology
20 Building Service Machinery
19 Radar Transmitters
Building Service Machinery
18 Weather Radar
17 DEPARTMENTAL HEADQUARTERS
Meteorology
16 Synoptic Meteorology
15 Dynamic Meteorology
Planetary Circulation
14 Theoretical Hydrodynamics
Long-Range Forecasting
13 Oceanographic Laboratories
12 Geochemical Laboratories
11 Isotope Geology Laboratories
10 Cabot Spectrographic and Sedimentology Laboratories
9 Earth Sciences Faculty Lounge
DEPARTMENTAL HEADQUARTERS
Geology and Geophysics
8 Crystallography Laboratories
7 Rock Mechanics Laboratories
6 Machine and Electronic Shops
5 Geophysics Laboratories
4 Geology Teaching Laboratories
3 Classrooms
Seminar Rooms
2 Lindgren Library
Schwarz Memorial Map Room
1 Lecture Hall

quasi-independent lines of investigation drawn together into an integrated science of the earth.

Geology, Geochemistry and volcanology, Geochronology, Geodesy, Geomagnetism, Seismology, Hydrology, Oceanography, Meteorology, Outer atmospheric and magnetospheric physics, Solar and space physics, Cosmic-ray physics—these are the subjects, in their terrestrial, lunar, and planetary aspects, that are the heart of this new school of earth sciences.

A New Breed of Intellectuals

The significance of our gathering is not the mere establishment of another department at a university—the significance of this gathering is far greater—that the earth sciences have come of age. These sciences now have been recognized by America's leading university in science and technology as a major and coherent branch of knowledge, worthy of a distinct organizational entity among its halls. We meet here to recognize that our knowledge has advanced to the stage where man can begin to predict, and, in growing measure, to control the total environment that his planet affords.

But we join together here for more than this. We join here to recognize the vision and wisdom of people who could visualize the meaning of our progress in this human activity, and transform this vision into action—among these people I would most especially mention Cecil and Ida Green.

This story of M.I.T.'s new school of earth sciences is really a story that symbolizes America's success. Here is the story of intellectuals, dedicated to a knowledge of the earth and the riches it could produce for mankind. As an M.I.T. graduate, Cecil Green, '23, went forth to study the earth, to advance the knowledge of it for man's welfare, and incidentally to return with a fortune created out of that knowledge—a fortune that could make this school a reality. This is the new breed of American intellectuals—those men and women who develop new resources from abstract ideas—resources that free mankind from drudgery and give him vast new opportunities for gainful employment—and who then plow the profits back to the further advancement of the mind.

Cecil Green acquired his thirst for a knowledge of Planet Earth the hard way. One evening as we sat in Julius Castle in San Francisco viewing the magnificent panorama across the bay over a gourmet dinner, he turned to me and remarked, "Lloyd, did you know that my first night in San Francisco was the night of the great earthquake!" Then he told me of sleeping in the park with his mother, and the problems of food, as fire raged through the city. What an initiation to the vicissitudes of the sciences of the earth. Yet one can clearly understand Cecil's early fascination with seismology.

Coming to America from England as a youth, Cecil's father had gone on to Vancouver to look for opportunity. Following his education at British Columbia and M.I.T. in mathematics, physics, geology and engineering, Cecil soon struck out as a pioneer in Texas with Erik Jonsson and Eugene McDermott to create the honorable profession of "doodlebugging." Erik was, as you might expect, an engineer of recent Swedish origin from Rensselaer, and Eugene a physicist from Stevens and Columbia. Nobel Laureate I. I. Rabi once remarked to me that while they were graduate students together Eugene was the only student in Columbia who could intellectually give him a run for his money.

Now the doodlebugger is a chap who makes an explosion and then determines the deep geologic formations below from the seismic echoes that are returned. This sounds easy now with computers and frequency sensitive filters, but in 1930 this was a new and novel idea. The test for successful demonstration of the idea was severe—if you could not find oil, you went broke—and with the discovery of the East Texas oil field everyone was sure that we had oil for a millennium, so why explore further. So one day Eugene politely suggested to Cecil that if he could find something else to do, it would greatly ease the company's cash-flow. So Cecil went back to International Telephone and Telegraph to engineer some more radio gear.

Products from Ideas

You can't underestimate the greed of the world for fuel, for after all energy frees man from labor. So in a few months Cecil was back at Geophysical Services, Incorporated, organizing crews for geophysical exploration and taking them to all parts of the world. This is one thing about geophysicists—they travel. The earth is their laboratory, and now, of course, they lay claim to the moon and the planets as well. I'm not quite sure of the origin of the term doodlebugger, but I have heard it said that geophysical crews operating for months far from home, in the steaming jungle or the fiery desert, in strange lands among strange peoples, have been known on a Saturday night to frequent saloons and other low dives. While I really don't believe such stories, I'll have to ask Cecil about them some time.

During the ensuing years these three men, Green, Jonsson, and McDermott, continued to build new resources out of science where no resources existed before. These resources were drawn from the human mind. Geophysical Services, Inc., under Cecil's presidency, brought new weapons into being during the war—weapons critical to America's staying power and our ultimate victory, and brought the company into the field of major manufacture. At the mid-century the original GSI grew into Texas Instruments, Inc., with the genius of engineer Pat Haggerty added to the team. Pat was known to all at the Radiation Lab at M.I.T. The output of the company now approaches a third of a billion annually, always tied to the creation of new products and services *from ideas.* But, I might add, the company has never forgotten its original love—doodlebugging—though today its applied geophysics employs the most abstruse devices of physics and electronics.

Photo by Charles Schneider

By **their gift of $6,000,000, Mr. and Mrs. Cecil Green, '23, of Dallas, Texas, gave the earth sciences a new home at M.I.T.**

I have often talked to Ida and Cecil about those early days when Cecil was gone for months in the field, and Ida remained home to keep the home fires warm and the purse strings viable. Let me say that it takes courage and vision to stay married to a geophysicist, and to encourage him to make those difficult and sometimes unpleasant decisions from which progress and success are woven. Yet Ida never faltered in encouraging Cecil in his first love—geophysics. Such tightly knit teams of man and wife surely gain strength beyond their numbers.

And so we honor a great new area of science that has come of age in the intellectual sense—the sciences of the earth.

We honor a great university that now recognizes this evolution in human thought with establishment of its Center for Earth Sciences—the Massachusetts Institute of Technology.

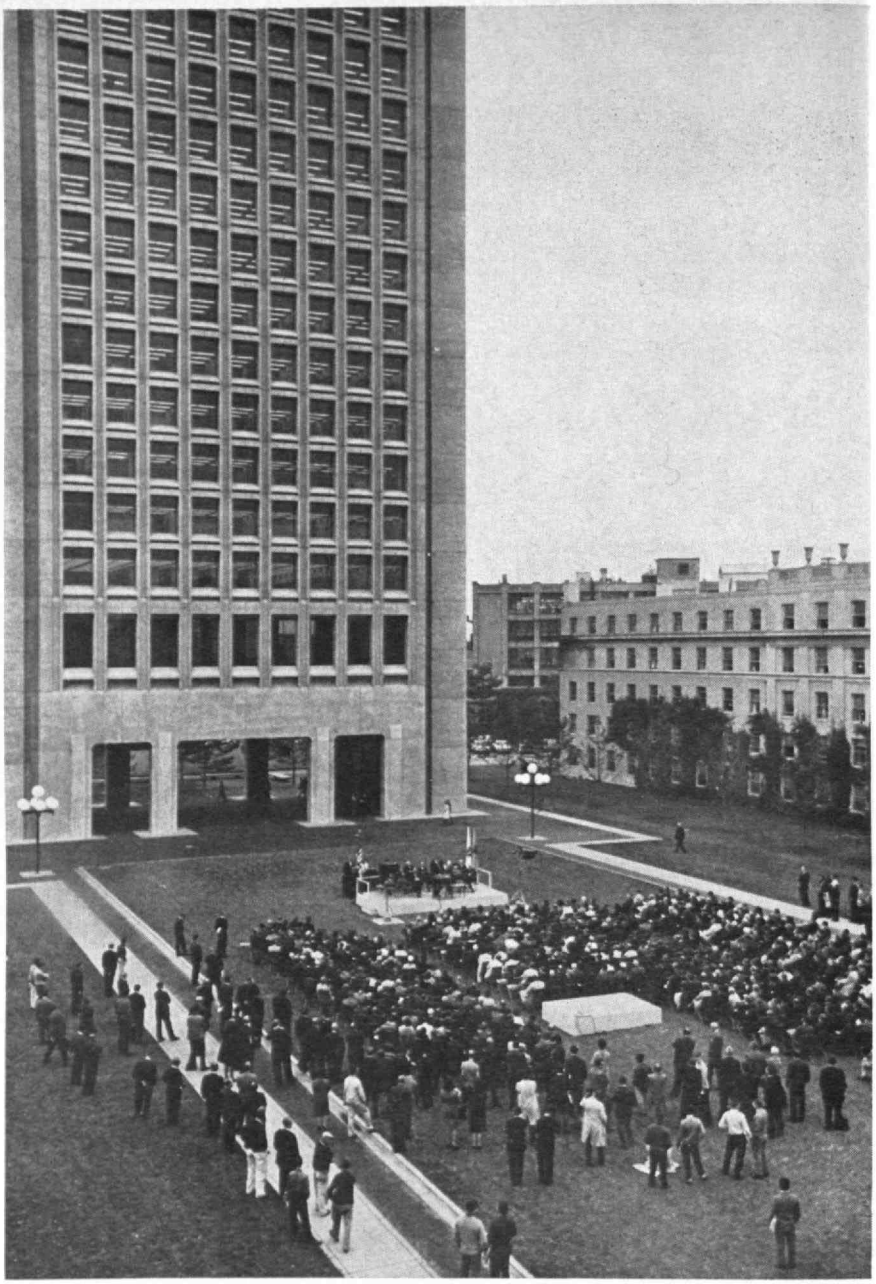
And we honor, for their dedication to the sciences of the earth, a dedication that has made this great new Center for Earth Sciences a reality—Ida and Cecil Green.

We Dedicate 'A Cathedral of Our Times'

THE CECIL AND IDA Green Building, described as "a cathedral of our times," was dedicated October 2. In presenting the building to the Institute and to his classmate, President Julius A. Stratton, '23, Mr. Green called it "a tall Texas outpost in New England (that) emphasizes that M.I.T. is truly international."

James R. Killian, Jr., '26, presided at the dedication on the building's South Plaza where about 600 persons including members of the Corporation assembled for the exercises. President Stratton, Professor Henry G. Houghton, '27, Head of the Meteorology Department, and Professor Robert R. Shrock, Head of Geology and Geophysics, spoke in response to Mr. Green's address. Dr. Killian announced a resolution by the Corporation to name the Green Building auditorium "McDermott Hall" in recognition of the contributions of Eugene McDermott, chairman of the Executive Committee of Texas Instruments Incorporated.

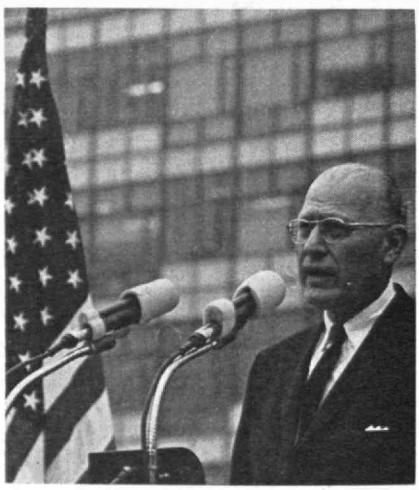
Dr. Roger Revelle of the Harvard Faculty gave the dedication address. "The study of the earth, from its fiery core to the Van Allen radiation belts, has become unity," he said. A deeper knowledge of the earth is essential also to the understanding of space, he added.



The Green Building towered high over the group that gathered to dedicate it.

The "storehouse of the earth" is key to man's prosperity, Dr. Revelle said.

Mr. Green gave M.I.T. a symbolic key to the building bearing a map of Texas.



Dr. Shrock spoke at the ceremony on behalf of his academic department.

A Portrait of Our Planet

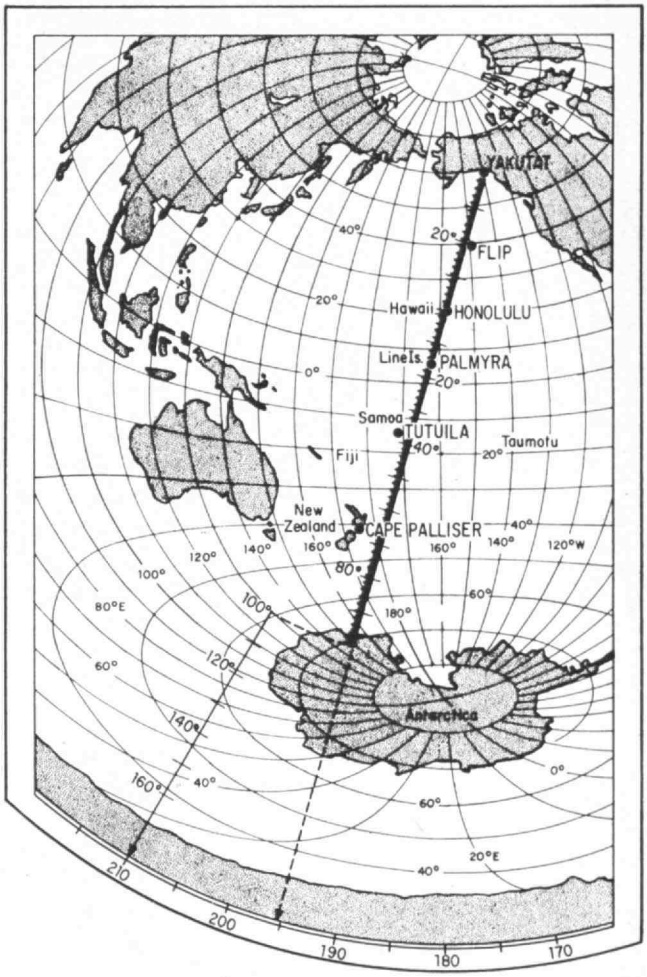
An international review of current theory shows it performs its wonders in ways still not clear

By William T. Struble

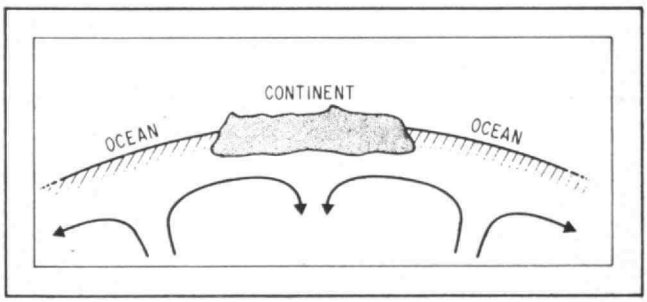
HAVE the continents of the earth, like giant cakes of ice, broken and shifted apart? If so, what moved them? These are foremost questions today to men striving to understand the slow but relentless changes in the earth's interior and its surface. Some geophysicists believe that there are convective motions —generated by radioactive and chemical heat—within the earth's mantle. Given, they say, about 90 million years, a column of mantle material rises to the surface, spreads out horizontally, then sinks again. It's somewhat like warming a pot of pitch, according to Walter M. Elsasser of Princeton. The solid stuff of the mantle comes up in the active ocean ridges, he suggests, and the hotter, lighter, more buoyant rock is carried like foam on the crustal current until it is deposited on the continents at the "downdrafts."

Thus the continents are growing and the oceans are getting deeper, according to this theory. But some earth scientists have a different view, and a debate on the concept of continental drift characterized the exchange of scientific ideas and data at the International Conference on the Earth Sciences at M.I.T. from September 29 to October 2. The conference brought together about 400 scientists and engineers, including many of the world's principal students of the earth and its environment, on the occasion of the dedication of the Cecil and Ida Green Building, home of the Institute's new Center for Earth Sciences. They discussed the seas of the earth and the *maria* of the moon, the motions of the atmosphere, the solar space environment, and the "solid" earth itself.

Agreed that our planet is not solid, too little evidence exists to shore up a hypothesis of continental drift, according to Professor Gordon J. F. MacDonald of the University of California (Los Angeles). A recent computer study of continental margins has turned up a close alignment between Europe and North America and between South America and Africa. The east-west travel time of earthquake waves in the Pacific mantle is different from the north-south travel time, perhaps indicating that the mantle has been stretched by continental drift. Yet, Dr. MacDonald held, there are uncertainties in the matching of continental borders and of geologic structures on opposite sides of the ocean basins; there is controversy over the significance of fossils of subtropical plants found in the Arctic; and although the present sediments on the ocean floor ap-



In an ocean-wide experiment, five stations established on a line across the Pacific measured sea waves as they interacted and dissipated over a span of more than 6,000 miles.



What goes on in the earth's interior? Arrows indicate how convection currents may move within the mantle, thereby carrying the continents apart over many millions of years.

pear too thin in relation to the age of the earth, this may indicate changing rates of erosion rather than a renewal of the sea bottom by convection currents.

Another source of energy must be taken into account in figuring the motions of the crust, according to Dr. MacDonald, who posed the question: "Why is the earth bulgier than it should be?" The rotation of the earth has been slowing at a rate of about two seconds in 100,000 years. Yet the shape of the earth today is the shape it would have had 10 million years ago if it were then a fluid figure spinning at a faster rate. Study of earth satellite orbits shows that the present equatorial bulge is approximately one-quarter of a mile larger than the rotational velocity would indicate, Dr. MacDonald said. This "disequilibrium gravitational energy" is stored as tension within the earth and is a source of energy comparable in size to the earth's sources of radioactive heat.

"Listening" to the Earth

According to the model proposed by Dr. Elsasser, convection would take place in the top 200 miles of the mantle, which extends down 1,800 miles. The deep rocks of the mantle are apparently homogeneous, however, and pressure waves—such as those from small underground atomic explosions—are distorted very little and travel great distances through this seismographic "waveguide," according to Frank Press, who directs the Seismological Laboratory of the California Institute of Technology. With the help of this discovery, Dr. Press reported, it has become possible to distinguish better between waves from explosions and those from earthquakes and to detect explosions at greater distances.

Better information on the speeds at which waves travel has helped to improve accuracy in determining the sites of such disruptions. These advances mean that improved monitoring systems can sort out seismic signals that were once confusing. In 1960, for example, scientists detected 500 "events" that at the time could be interpreted either as earthquakes or one-kiloton explosions. This number of "suspicious" events has already been reduced by one-half and anticipated refinements in seismological science may cut the number to about 40.

Like a bell tapped by a hammer, the earth is still "ringing" from the great Alaskan earthquake of last March 28, Dr. Press also reported. In addition the earthquake apparently caused a permanent change in the strain within rocks over a large region. This change was noticed particularly in Hawaii where a strain seismometer had been installed shortly before the earthquake, and its detection suggests that earthquakes may be predicted by a network of such instruments placed in earthquake zones, he said. Dr. Press heads a committee that the President's Office of Science and Technology has asked to study the possibility of earthquake prediction. Professor Egon Orowan of M.I.T. is a member of the committee.

How *have* the continents been formed? In drawing the chronology of the land masses, the isotopes contained in the rocks offer a means of determining whether the geologically younger parts of the continents are "new" material derived from the depths or whether they represent changes of older rocks. The continental and oceanic crusts are distinctive features, G. J. Wasserburg, also of the California Institute of Technology, noted. By contrast with what is surmised about the oceanic crust, he said, the continental crust is very complex in structure and in types of rocks. And even though materials of great age have been found in the continents, so far no ancient samples of oceanic crust have been recognized.

But new "isotopic age provinces" seem to be emerging from these studies, he said. One of these is the so-called Grenville Province, which is a large subcontinental segment in the eastern Canadian shield. Measurements of isotopic ages of rocks in the Grenville Province showed them to be somewhere between 800 m.y. (million years) to 1,150 m.y. old. With continuing "age-mapping" scientists have found rocks of similar antiquity in the Adirondacks, the New Jersey Highlands, Maryland, North Carolina, and Texas. On the basis of these measurements, he said, the original geologic province becomes a time-belt "of fully continental dimensions." In the conference sessions on "The 'Solid' Earth," A. E. Ringwood of the Australian National University reported on laboratory studies of the effects of high temperature and pressure on germanites and silicates, and Francis Birch of Harvard discussed the temperature, heat production, and thermal history of the earth.

Exploring the Ocean

Like seismic waves, the waves of the sea can be read for information about events at far distant points. And a recent transoceanic study of Pacific Ocean waves suggests some new theoretical notions about submarine and atmospheric currents. Five stations spanning 10,000 kilometers along a south-north line in the Pacific measured waves as they grew weaker and gave a picture of the interaction of waves across the vast expanse from the Antarctic to the Arctic, according to Walter H. Munk of the University of California (San Diego). Somewhat as two radio frequencies produce a third "beat frequency," oceanic waves interact on local and world-wide scales; ripples of one centimeter, great sea swells 1,000 meters long, global oscillations and the long-term variations in sea-level—all these are coupled to each other and affect each other in complicated ways, he suggested. Within the ocean deeps there also may be long pressure waves that interact to produce submarine currents, and the circulation of the atmosphere may come from the interplay of "high frequency" events such as cyclones.

But oceanographers consider the primary forces driving the ocean currents to be heating, cooling, the winds, and the effects of the earth's rotation. To inter-

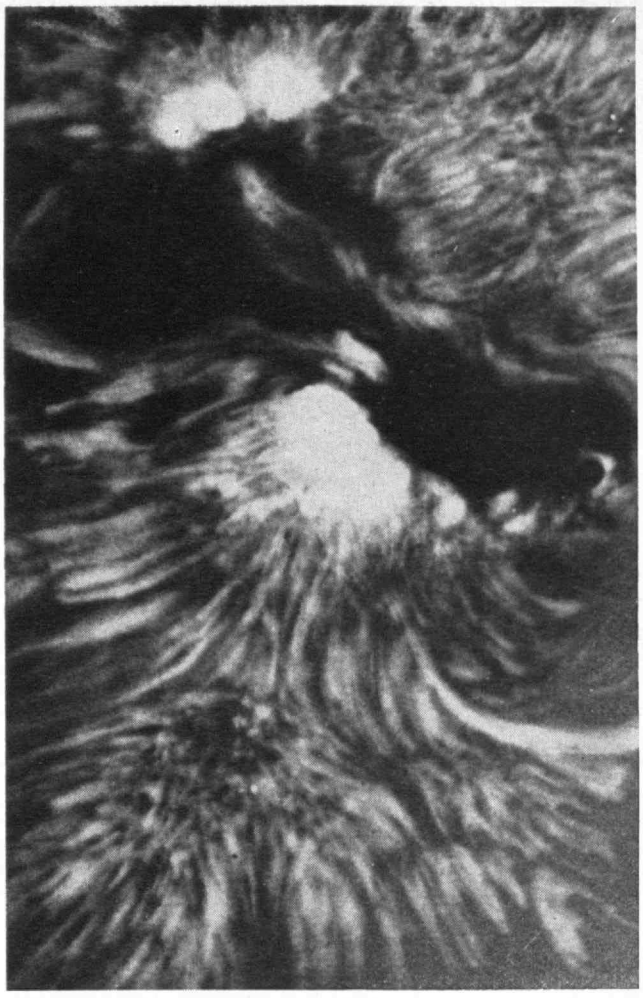
pret these complex streams, Professor Henry M. Stommel of M.I.T. sketched the path a particle of water might follow at various levels from the bottom to the surface of the oceans until it finally returns to the starting point after some hundreds of years. The "history," in effect, formed a theoretical model of an ocean that oceanographers have followed in their seagoing search for ocean currents.

The circulation of the oceans and of the atmosphere in past geologic ages may also be traced by analysis of ocean sediments, which are estimated to be from 200 million to 300 million years old. Gustav Arrhenius, of the University of California (San Diego), noted that equatorial sediments are rich in organic remains and suggested that a thorough survey of the ocean floor would thereby produce information as to whether the earth's poles may have been at different points in the past.

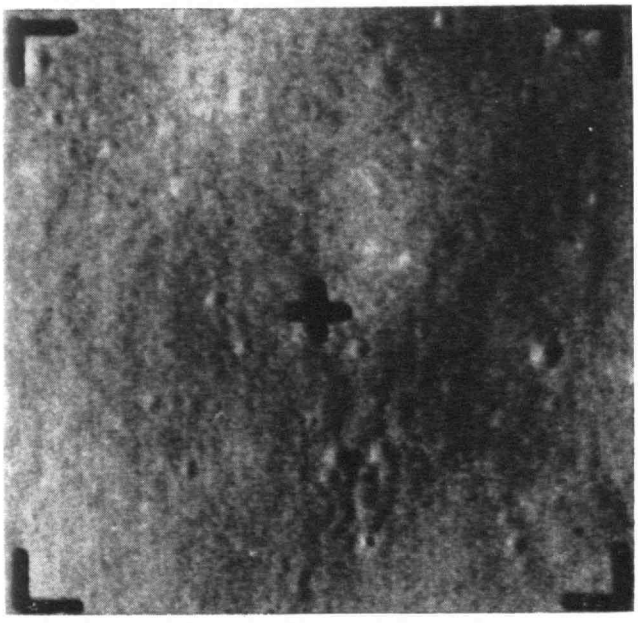
Problems of Weather

The atmosphere as we experience it in present times is in a state of continual motion sustained by energy from the sun against the dissipating effects of friction and it thereby presents a challenging problem to the meteorological scientist, according to Professor Edward N. Lorenz, '43, of M.I.T. The problem is: Is it possible to determine the features of the global circulation directly from the laws of physics that govern it?

The meteorologist must know whether the atmosphere signals its intentions to him, he said, but the atmosphere appears to be a nonperiodic system—one which never does the same thing twice except for its daily and annual periods. There are many uncertainties in observing the atmosphere that are a result not so much of faulty observations as of the impossibility of observing the weather everywhere and all the time, he said. Even in the United States and Europe, where weather stations are most closely spaced, some thunderstorms between stations go unnoticed. Outside the principal shipping lanes, the gaps in observations at sea are large enough to conceal full hurricanes.



The feathery whorls in this photograph of the sun stream out from a solar flare. Observations indicate these great flares may represent conversion of magnetic energy into heat, but nobody has yet developed a satisfactory theory.



The dark areas in this Ranger 7 photo of the moon have been described as lava fields, which were formed during the first hundred million years of the moon's history when the interior rocks were melted by heat of radioactivity.

Under these conditions there is a limit as to how far into the future meteorologists can predict the weather, he said. Although the atmosphere may be periodic, with a period longer than the duration of recorded history, this does not appear true, Professor Lorenz said. Thus if the atmosphere does not repeat its previous behavior in any detectable way, it cannot be predicted to do the same thing twice by any forecasting scheme.

These meterological "observations" come from numerical computations that permit experiments on the atmosphere "with no risk of rendering the earth unfit for future habitation," Professor Lorenz said. Some conclusions from this research are that moderately good forecasts as much as two weeks in advance may become possible. But accurate, detailed forecasts for

(Concluded on page 48)

The Trend Of Affairs

Concentrated Magnetism

THE STRONGEST continuous magnetic field ever generated was achieved this fall by the National Magnet Laboratory at M.I.T. A power supply of 10 million watts from the laboratory's huge motor-generators was used to produce a field of 255,000 gauss. With this accomplishment, says Laboratory Director Benjamin Lax, '49, "we are opening up a new realm of magnetic field research."

High magnetic fields are an invaluable tool for exploring nuclear, atomic, and molecular structures and other properties of materials. Physicists hope that entirely new phenomena may be discovered by this means.

The peak field was measured in test runs October 30 in a magnet that was designed by D. Bruce Montgomery, '57. This instrument consisted of a nest of three concentric solenoid magnets, with two small cone-shaped iron magnets inserted in the tubular core. The record fields were produced for about one minute in a tiny area between the tips of the cones. This area is only one-eighth of an inch wide and one sixty-fourth of an inch high, but is large enough for some experiments. The 56,000 amperes of current used in the magnet create enormous pressures of 60,000 pounds per square inch, greater than those which exist in the deepest parts of the ocean. A flow of 2,000 gallons of water a minute cooled the magnet, which otherwise would melt.

Although the gap in this magnet is small, the laboratory staff believes that comparable fields can be produced in larger areas, according to its Assistant Director, Donald T. Stevenson, '50. A quarter-million gauss field was the design objective of the laboratory, which was dedicated in April, 1963, and was built with Air Force funds.

In the future the laboratory staff expects to produce continuous fields of 300,000 gauss and pulsed fields of more than 400,000 gauss.

A technician x-rays hands, wrists of Guatemalan children.

The Bones of Babies

EVEN WHEN starving, the human body apparently goes on producing enzymes, hormones, and other special products needed for metabolism. Scientists therefore suspect that when the dietary supply is too low the biological system may raid other body tissues—at the expense of both physical and mental development. There is now evidence that even bones may be depleted in this way, according to Miguel A. Guzman, Visiting Associate Professor of Biostatistics at M.I.T.

The evidence appears in 3,000 x-rays of wrist and hand bones of undernourished and starving children in Guatemala. These radiographs show that children suffering from extreme protein-calorie malnutrition have less compact bone than "better-fed" ones and they also indicate actual loss of bone as well as failure to develop new bone in the course of growth. Simple measurement of the thickness of compact bone may prove to be an index of other complications, says Dr. Guzman, and work is continuing to correlate it with the effects of malnutrition on bone "density," teething, general body growth, and mental development.

Guatemala is a country where in some rural areas almost half of the children born alive die of malnutrition or its consequences before they reach school age. The x-rays reveal that some youngsters with kwashiorkor and marasmus, the diseases of malnutrition, have no more compact bone when they are four to six years old than a normal Guatemalan child would be expected to have when only one year old.

The children showing the severest loss of bone were among 95 hospitalized in the clinic of the Institute of Nutrition of Central America and Panama (INCAP), which made the five-year study, reported recently in *Science,* in co-operation with the Fels Research Institute. X-rays of the patients were compared with those of 694 other children, who were undernourished but not ill, in two Guatemalan Indian villages.

Dr. Guzman, Head of the INCAP statistical division, is at M.I.T. under a co-operative program established by Dr. Nevin S. Schrimshaw, who was director of INCAP for 11 years before coming to the Institute as Head of the Department of Nutrition and Food Science.

Visitors From and to Berlin

THE FORD FOUNDATION announced a $500,000 grant this fall to enable M.I.T. to help the Technical University of Berlin strengthen its teaching, research, and administration. Up to 25 professors will come to Cambridge from Berlin for an academic year, and members of the M.I.T. Faculty will go to Berlin for visits of up to a year made possible by this grant.

The Technical University of Berlin now has more than 10,000 students, including almost 1,000 from foreign countries. It was established in 1879 by a merger of academies devoted to architecture and to industrial studies. It is now re-examining its traditional practices, and planning to introduce teamwork in research, to broaden its humanities and social science programs, to expand some of its science departments, and to modernize its administration.

M.I.T. professors will serve as consultants and offer courses in Berlin similar to those given each summer here for professors from American universities. Four guests from Berlin have already arrived at M.I.T.; they are K. A. Becker, K. W. Bieger, H. R. H. Lechner, and C. E. Schreck who are working, respectively, in the Departments of Chemical Engineering, Civil Engineering, Economics and Social Science, and Mechanical Engineering.

Because the missions of M.I.T. and the Technical University of Berlin are similar, close collaboration is certain to benefit both institutions as they adjust to the needs of today's technological society.

The Camille Dreyfus Professorship

A $500,000 GRANT from the Camille and Henry Dreyfus Foundation, Inc., has established the first endowed chair in the Department of Chemistry at M.I.T. The grant was anounced jointly this fall by Mrs. Jean Dreyfus Boissevain, the Foundation's President, from her residence in Florence, Italy, and Chairman James R. Killian, Jr., '26, of the M.I.T. Corporation.

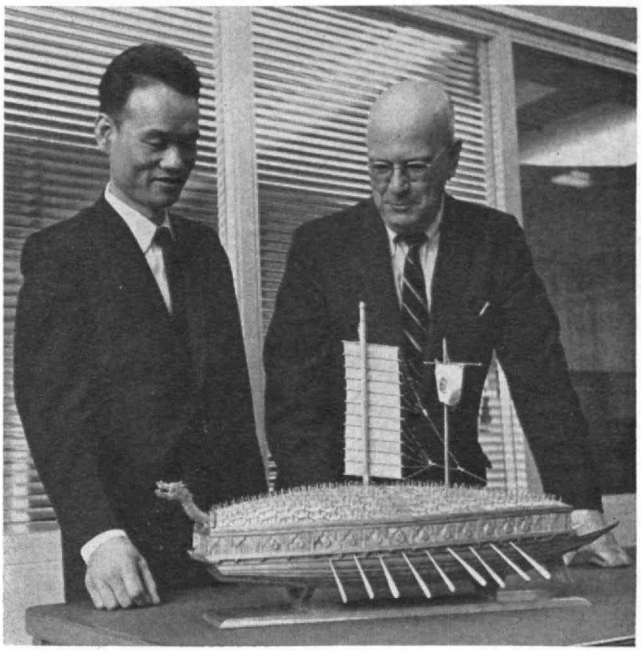
The professorship honors the memory of the Swiss-born chemist who, with his brother, Henry Dreyfus, undertook early basic research in cellulosic chemistry, successfully made the first cellulose acetate yarn, and formed three major chemical-industrial enterprises: British Celanese, Ltd., Canadian Celanese, Ltd., and the Celanese Corporation of America.

The Dreyfus brothers were graduated from the University of Basel, began their research at the Sorbonne in Paris, and produced the acetate "dope" used on aircraft wing and fuselage fabric coverings in England during World War I. They came to America at the urging of President Woodrow Wilson in 1917 to start a similar operation at Cumberland, Md. Henry Dreyfus died in 1944, and Camille Dreyfus in 1956, and the Dreyfus Foundation has as its purpose the advancement of the science of chemistry, chemical engineering, and related sciences as a means of improving human relations and circumstances throughout the world.

"Through this professorship," said President Julius A. Stratton, '23, "Dr. Dreyfus' lifelong dedication to excellence and achievement will be perpetuated to serve as an inspiration to new generations of chemists."

How Men Once Fought

CHANG W. SHIN, G, has given the Francis Hart Nautical Museum at M.I.T. a model of a Korean Warship invented in 1591 and called "The Turtle," a symbol of indestructibility. The original ship was 113 feet long and had an iron cover over its deck. Spikes protruded from this shielding, but were covered with grass, to deceive boarders. Oars lined the sides, and the mast could be folded back for battle. Sulphuric acid fumes could be emitted from the Turtle's dragonlike head both to terrify the enemy and provide a smoke screen.



Chang W. Shin, William A. Baker, '34, and "The Turtle."

Mr. Shin, who is now a teaching assistant in the Department of Naval Architecture, built the model while he was on the staff of the Inha Institute of Technology in Inchon, Korea. He gave it to the museum to illustrate a phase of Korean naval history, "in memory of his studying at M.I.T."

Movies in the Library

MANY OF the pages of textbooks on fluid mechanics are coming to life these days in moving pictures. Like books, they may be borrowed from the library, and students may view some of them in the M.I.T. Engineering Library's own miniature "theater."

So far about 34 short, single-topic films and 10 longer ones are available. The former are silent four-minute film loops enclosed in a plastic cartridge which a borrower takes to a small projector box. No rewinding is required and films may be repeated as often as the viewer wishes. The longer films running from 25 to 40 minutes are shown regularly at the Institute but they also may be borrowed from the library.

As a member of the Co-operating Group of the National Committee for Fluid Mechanics Films, M.I.T. receives the films for experimental use and for evaluating the ways in which such visual material can be used in the classroom and outside it.

(The Trend of Affairs is continued on page 56)

Should Science Be for Men Only?

The proportion of women in it and engineering is declining, and 700 hear the opportunities discussed at an M.I.T. meeting

IN THE United States today about 30 million women hold jobs. Yet only 8,000 are employed in engineering—a number equal to about 1 per cent of the nation's total force of engineers. In the natural sciences there are only 15,000 women or 10 per cent of the total. And the proportion of women in science and engineering is declining.

These statistics support the argument that the nation is wasting intellectual resources, speakers told a symposium this fall at M.I.T. A conference October 23 and 24 on "American Women in Science and Engineering" was sponsored by the M.I.T. Association of Women Students, and drew 700 delegates and visitors from throughout the country.

Dr. Killian Cites Contrasts

"The status of women in America presents a number of striking contrasts and paradoxes," Chairman James R. Killian, Jr., '26, of the M.I.T. Corporation, told them. During the earliest days of the nation, American women had great freedom compared to those of other nations, and higher education became available to women in significant numbers earlier in the United States than in any other country. Yet, he noted, the 1960 Report of the President's Commission on National Goals emphasized that "the fullest development of every individual is hindered by underestimating the potential of a majority—women."

According to one study that Dr. Killian cited, women received about 10 per cent of the doctoral degrees in this country in the 1950's, as compared to almost 15 per cent in the 1920's. Today, he noted, the National Academy of Sciences includes only five women out of 707 members. He referred also to a National Manpower Council report on "Women Power," which noted that although one-third of all women in the United States are in the labor force in any given month, women represent a smaller proportion of the U.S. professional and semi-professional occupations than they did a quarter of a century ago.

Opportunities Are Increasing

A sampling of opinion among major employers of professional personnel in science and engineering, however, "reflects the growing opportunities for women in science and engineering, while at the same time pointing up the limitations that apply," Dr. Killian said. From the statistical trends and employer comments he drew three conclusions:

► "The rapid growth of population in the professions, especially in science and engineering, will bring enlarged opportunities for women, although the increase in opportunities will not be in proportion to the increase in the numbers of scientists and engineers."

► "More women must prepare themselves more adequately for the practice of science and engineering. At present, the declining proportion results mainly from the lack of qualified candidates."

► "The role of women in the professions must be designed to be compatible with marriage and the rearing of families. This means especially that new and convenient ways must be devised so that women may have families and still continue their education," he said, and he cited retraining programs under way at five colleges and universities.

"The first lady of engineering," Lillian M. Gilbreth participated in the symposium's lively discussions.

Susan L. Strong, a student at Sweet Briar College, was among the delegates who came from 150 colleges in the U.S.

The Marriage Problem

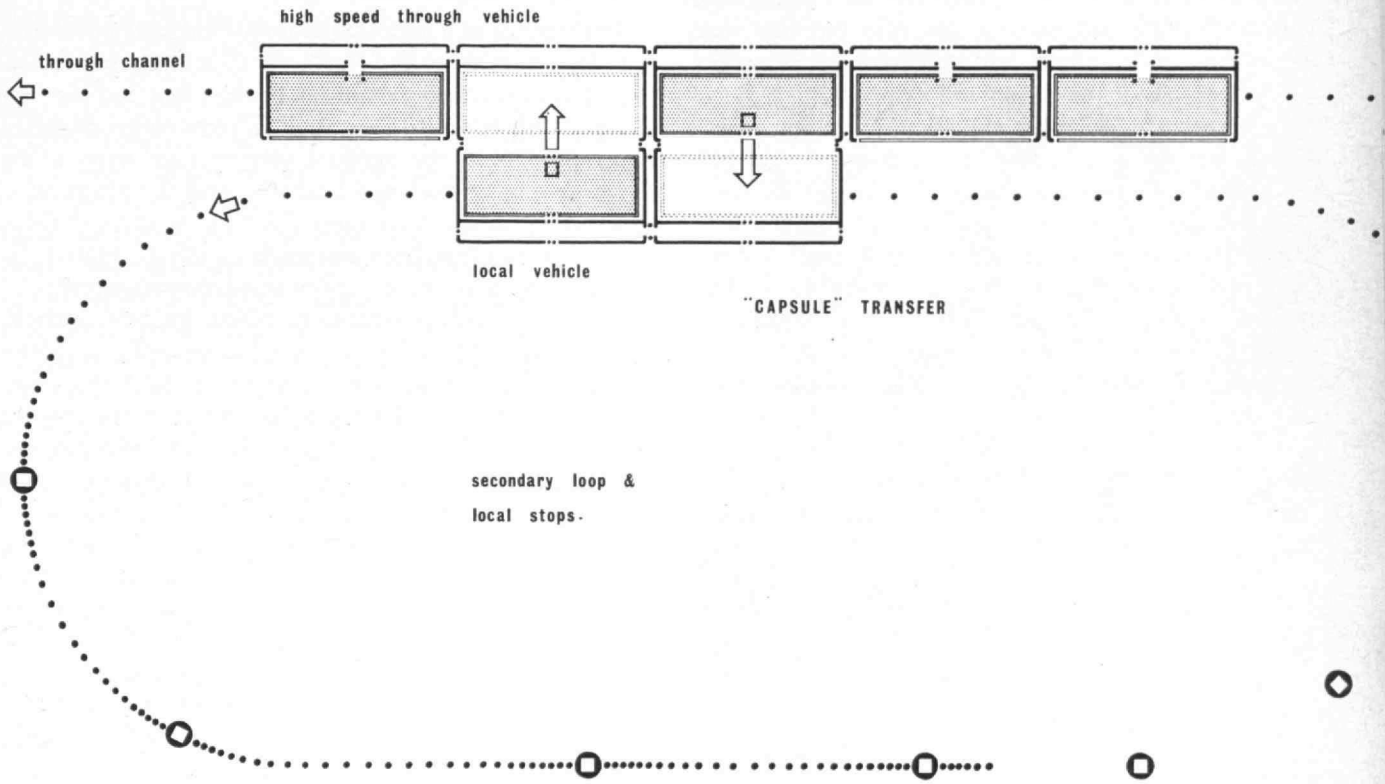
The question of marriage versus career is important in determining why so few American women are numbered among scientists, engineers, and doctors, Alice S. Rossi, of the University of Chicago, told the symposium. The more degrees a woman has beyond a bachelor's degree, the less likely she is to be married; and women who enter the more demanding professions may remain unmarried "not simply because they are not chosen by men, but because they find fewer men worth accepting, and because marriage is not an exclusive life goal," she said.

Dr. Rossi reported preliminary results of a study she is making of

(*Concluded on page 46*)

Must Short Trips Take So Long?

Very fast ground transportation by a new mode could demonstrate our technological leadership



1. HIGH SPEED CAPSULE TRANSFER TO LOCAL LOOPS

Dots close together indicate low speed, those far apart high speed, in this concept of an integrated intercity system.

THE TRAVELER between Washington and Boston, in the 2 per cent of the nation where 20 per cent of the people live, still can only creep much of the time. "Patience and fortitude," New York's late Mayor LaGuardia counseled. But an M.I.T. study group reported last October 9 that it is neither necessary nor consistent with our technological leadership of the world for transportation in this area to be so underdeveloped. If advanced technical resources were exploited boldly and imaginatively, this report asserted, this region soon could have a complete, new, efficient, and competitive system for transporting its people and its goods.

The study was undertaken as part of the "Northeast Corridor Transportation Project" for the U.S. Department of Commerce. It drew together in the new M.I.T. Center for Advanced Engineering the professional skills of leaders in the Schools of Engineering, Science, Management, Architecture and Planning, and Humanities and Social Science. Colleagues from industry, government, and other institutions joined them and, under the direction of Professor Robert J. Hansen, '48, the group prepared an interim report intended to lead to a preliminary plan for a program of research and development to advance the technology of High Speed Ground Transport (HSGT) in the Northeast Corridor.

From Door to Door

A physically different mode of transportation is now needed, the group concluded from its review of highway, rail, and air travel problems and prospects. This wholly new kind of system, the report declared, should be designed to meet rigorous requirements:

"Door to door travel time must be cut. . . . Intercity and intracity travel facilities must be coordinated. . . . Trunk line speeds must average 200 m.p.h. . . . New provisions for passenger entrance and exit are needed to maintain this average speed. . . . System 'choking' during daily peak travel periods should be avoided;

comfort, safety, convenience, reliability and ready access are important design goals."

The system envisioned would operate on or near the ground, in all kinds of weather, and be so laid out as to provide "widespread, easy and rapid access to all locations in the corridor." It should offer "a level of service in terms of door-to-door travel time, comfort, frequency of service, and fare structure" that would attract people. The accident expectancy should be no greater and preferably less than that of other modes. The cost should be acceptable, the system should be both adaptable to changing demands and compatible with existing feeder arrangements, and the side- and after-effects of its establishment should be consistent with other goals of the nation and its people.

To meet such design criteria, the study group found, wholly new kinds of vehicles, roadways, operational and control systems would be needed, but its members believe that both technical and system cost problems "could be brought within reasonable limits." And it continued, "if detailed studies were initiated in 1965, specific research and development tasks could be started in 1966, prototype construction could begin in 1968, and a complete system for the Northeast Corridor achieved by 1976."

Guideways for New Vehicles

The authors spoke frequently of "guideways" rather than rails or roads, and discussed novel kinds of channels, vehicles, propulsion, and control that might be considered and evaluated with respect to the requirements of an over-all system.

A guideway for through vehicles traveling 200 or more m.p.h. between New York and Washington, for example, might be an enclosed tube in which capsules containing passengers and baggage might be propelled by fluid jets. The jets might be either ejected from the vehicles into buckets along the guideway, or ejected from the sides of the guideway into buckets on the vehicles.

To enable passengers to get on or off at intermediate points without causing delays on the through channel, there might be loop guideways at appropriate points alongside the main one. The capsules in which some passengers were seated then might be shifted from the loop routes into the through route, or vice versa, without bringing them to a standstill in either channel. Along the loops, the capsules could stop at points convenient for local passengers.

In addition to eliminating the through passenger's stop at North Philadelphia and elsewhere in some such way, the report suggested that the planners of an integrated network of facilities might consider new kinds of mechanical suspension of the vehicles, the use of air or fluid pads to support capsules in the guideways, and combinations of traditional and new methods of toting people and things hither and yon.

"Control problems in any HSGT system will be critical, demanding mechanisms, techniques and concepts which probably do not yet exist."

Throughout the report, the M.I.T. group stressed the interdisciplinary nature of the Northeast Corridor's transportation problem. "Too often," it said, "the social scientist makes his studies years after the engineer has finished his work, and neither profits from the other's efforts." Questions will arise, the report predicts, about social and economic impacts, ownership and administrative control, and local and national policies, which should be explored at the same time as the technical aspects of a new mode of travel.

A New National Goal

The benefits of a major program to bring advanced technology to bear on the Northeast Corridor's transportation system would extend far beyond that corridor, the report emphasizes. Construction technology might be revolutionized, the support base of our national research effort broadened healthily, and the attention of the professional community focused on problems that have for too long been dismissed as too qualitative, indeed subjective, to be approached quantitatively.

"The technology of transportation for both intercity and urban application would be advanced for utilization throughout the nation and the world," the report predicted. "The technological resources of the nation, many of which are an outgrowth of defense requirements, could contribute in a dramatic way to one of the most significant requirements for sound economic growth—expanded transportation facilities. The technological advances from the HSGT program would have direct application to other major problems of the nation. . . .

"To undertake a major step forward in providing new transportation services for our citizens would mobilize the nation toward a new and exciting national goal."

Associate Professor E. Farnsworth Bisbee was associate director of the group which prepared this interim report; Professor Charles L. Miller, '51, was senior adviser; Assistant Professors S. William Gouse, Jr., '53, and Igor Paul, '60, directed technical studies; and Patrick F. Cox, a visiting engineer, was the executive officer. Other participants included the heads of numerous departments at M.I.T. and many eminent representatives of both the Faculty and Administration.

PROF. ROBERT J. HANSEN, who directed preparation of the preliminary report cited in this article, received his doctorate at M.I.T. in 1948, and has been on the Faculty ever since. He has been active in structural research and has served the National Academy of Sciences as adviser on civil defense and other protective measures against the effects of nuclear weapons.

Man as a Living Organism

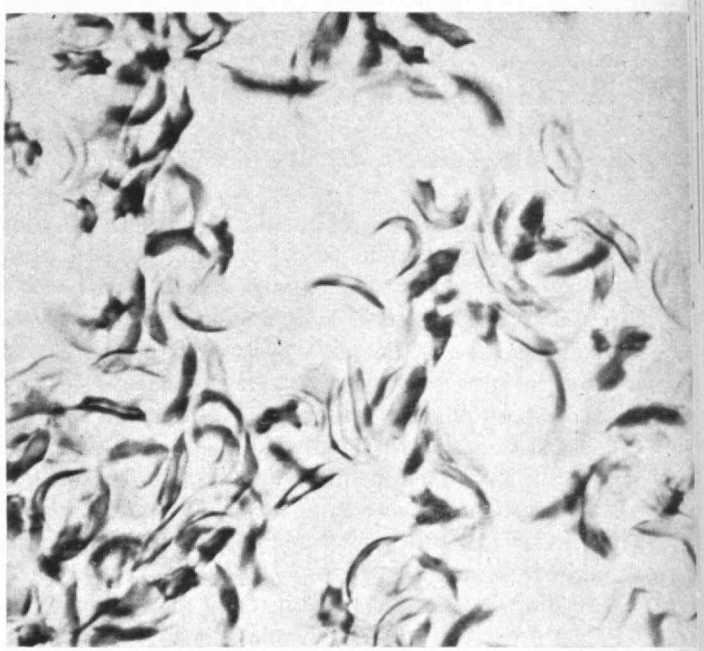
Biologists have begun to relate what happens in molecules to what happens to human beings

BY VERNON M. INGRAM
Professor of Biochemistry at M.I.T.

RECENT advances in molecular biology have given us a much clearer picture of the nature and manner of synthesis of those molecules, large and small, which make up living cells. The body of a man is, however, much more than the sum of its component molecules or even its cells. This realization raises problems which we can only just begin now to formulate.

The tremendous increase in our understanding at the molecular level of biology has far outstripped our ability to relate this level of understanding with the much older body of information about an organism studied as a whole. The great challenge in molecular biology today is to find ways of translating the information which we have about what goes on inside the cell, at the molecular level, into terms which are appropriate and which can be applied to the functioning of the whole organism. No such "dictionary" exists today. The two prime areas of biology where people are most actively searching for such an intellectual synthesis, and where perhaps progress might most reasonably be expected, are the attempts to understand the functioning of the nervous system at the molecular level and the effort to understand the relationship between the molecular events in cellular biosynthesis and the development of an organism, that is to say:—differentiation. In these two major areas of biological research we are still so far away from being able to reconcile the molecular and the organismic order that we do not even know how to ask or formulate questions which have a realistic hope of being answered.

On the other hand, there is a related area of biological research where our knowledge of the functioning of the whole organism and of the functioning of certain specific individual molecules can be brought together; this is the area of the "molecular diseases," a term introduced by Pauling in 1949. He had in mind diseases which are caused by a definite biochemical abnormality at the molecular level. In the present article we will discuss a particular molecular disease, sickle cell anemia, in which we can point to a definite biochemical abnormality of a protein molecule, fitting the abnormality into the current picture of protein biosynthesis inside the cell. On the other hand, this is a disease in which we can point to the effects of the basic abnormality on the functioning of the whole organism. The study of



The sickling of red blood cells as photographed (1500 x) by Dr. H. Lehmann, of Cambridge, England.

sickle cell anemia has thrown much light on the molecular and biological mechanisms of molecular diseases. In fact, sickle cell anemia has been discussed before in a number of articles and books from just this point of view. Nevertheless, it is still one of the clearest examples of a molecular disease and one in which both the molecular aspect and the biological aspect are relatively well understood.

The Chemistry of Hemoglobin

To understand the basic defect in this disease, we must describe briefly some of the outstanding characteristics of the protein hemoglobin. This protein occurs as a very strong solution inside each of the red cells in our blood, as in all other vertebrates. The function of hemoglobin is to combine with oxygen during the period of time which the blood spends in the blood vessels of the lungs. An excess of oxygen is available there and oxygen is carried away by the blood combined with the hemoglobin molecules inside the red blood corpuscles. He-

moglobin is able to combine with oxygen because it carries special iron-containing groups in the molecule, the so-called heme groups.

Most of the hemoglobin molecule is made up of protein, however, that is to say it is composed of long chains of amino acids combined together to form polypeptide chains. In its molecular weight of 68,000, hemoglobin has four subunits; two *alpha* polypeptide chains and two *beta* polypeptide chains, each arranged as a more or less spherical subunit. Each of these subunits carries its own heme group and, therefore, the whole hemoglobin molecule with its four subunits is capable of combining with four molecules of oxygen. The type of abnormality with which we are concerned in sickle cell anemia is an abnormality of the protein portion of the molecule, that is to say, an abnormality of the peptide chains. It is only indirectly, as we shall see, that the function of the molecule is affected.

Sickle Cell Anemia

From the point of view of our discussion, the most important fact to note about sickle cell anemia is that the defect is an inherited one. The geneticist Neel in 1949 showed that the disease is inherited according to the Mendelian laws of heredity. Two types of the disease had been known previously: a severe anemia, usually fatal before the person reached the productive age; and the milder sickle cell trait, which was very much less severe in its clinical manifestation and, in fact, did not usually produce severe symptoms of anemia until the individual was exposed to conditions of rather severe oxygen lack.

Pauling and Itano showed in 1949 that the individuals with severe sickle cell anemia had a chemically different hemoglobin in their red corpuscles, the so-called sickle cell anemia hemoglobin or hemoglobin S. Moreover, these workers were able to show that in the sickle cell trait, the much less severe condition, both normal hemoglobin (hemoglobin *A*) and the abnormal hemoglobin S were produced side by side. The two hemoglobins occurred roughly in the proportion of 60:40 in favor of the normal hemoglobin.

The genetical investigations of Neel interpreted the existence of the two states of the disease and of the production of one or both of the hemoglobin parts in terms of the hereditary mechanisms proposed by Mendel. Since in man, as in all other diploid organisms, each genetic characteristic is controlled by a pair of genes, a maternal gene and a paternal gene, so also in hemoglobin pairs of genes are involved. The production of the abnormal hemoglobin S in this view has been due to the occurrence of an abnormal hemoglobin gene in that individual. A person suffering from sickle cell anemia who produces only abnormal hemoglobin S (to a first approximation) is in genetic terms homozygous for this abnormal hemoglobin gene, i.e., he has both members of the gene pair in the abnormal form.

Similarly, the normal individual is homozygous for the normal form of the hemoglobin gene and produces only the normal hemoglobin. On the other hand, the person with the sickle cell trait is heterozygous and since he possesses one normal and one abnormal hemoglobin gene he will make both normal and abnormal hemoglobins. This is, in fact, what was found.

Genetic Control of Protein Structure

Here, then, is definite information about a most important body protein, hemoglobin, at the molecular level which demonstrates very clearly the kind of control which exists over the production of this protein. When the gene controlling the structure of the polypeptide chains in this protein is normal, then the chemical composition of this polypeptide chain is also normal. But when the gene is abnormal, presumably in just a small portion of its structure, then an abnormal peptide chain is made and, therefore, an abnormal hemoglobin protein. This is, however, abnormal only in that part of its structure which corresponds to the abnormal portion of the controlling gene. We now have a great many examples of abnormal human hemoglobins which are chemically different from the sickle cell anemia hemoglobin and which are produced by the occurrence of other and different genetic variants of the hemoglobin gene. The manufacture of a defective protein results in sickle cell anemia in a most severe disease condition, although in the case of most other abnormal hemoglobins no obvious disease exists.

In fact, the control is even better, because hemoglobin with its four subunits has two types of peptide chains, the *alpha* and the *beta* peptide chains. Each of these two types has its own pair of controlling genes. Either of these gene pairs might have been affected and altered by gene mutation. Therefore, two series of abnormal human hemoglobins exist; those which possess a chemical abnormality in the *alpha* peptide chain; and those which possess a chemical abnormality in the *beta* peptide chain. Sickle cell anemia, hemoglobin S, is an example of the second class of abnormality since its chemical modification exists in the exchange of the "normal" amino acid, glutamic acid, by the "abnormal" amino acid, valine. Although the amino acid valine is one of the commonly occurring protein constituents, it is here designated as "abnormal" only in the sense that it occupies the position normally filled by glutamic acid.

We have indicated that there is precise genetic control over the structure of at least one important human protein. Presumably, similar mechanisms exist to ensure the production of the correct structure of all other body proteins as well.

Replication of Genetic Information

We recognize in this system one of the most important characteristics of the genetic control mechanism, namely, its *conservative nature*. It is the primary function of such a control to make sure that succeeding generations of any organism will resemble each other. To this end a mechanism is needed which produces exact cop-

ies of whatever protein is required. Such an exact mechanism is the mechanism of cellular protein synthesis. Here the precise information for making a particular protein which is contained in the genetic material, DNA, is precisely translated into the information contained in the so-called messenger RNA or template RNA inside the cell; in turn on such a template is assembled the peptide chain of whatever proteins are made. It is most important and highly characteristic of this rather complex system of protein synthesis that it makes very few mistakes.

It is a second and most vital requirement of the genetic control mechanism that its primary repository of information, the DNA of the genetic material, should itself be replicated in an exact fashion. After all, new cells have to arise constantly during the growth of an organism and new cells have to be made when an organism is reproduced. Each of these cells has to have its collection of genes and the exact mechanism of DNA replication makes certain that exact replicas of the genes are handed on to the new cells. A biochemical mechanism by which the DNA is replicated so exactly is the enzyme DNA polymerase studied so extensively by Kornberg and his colleagues.

A conservative mechanism for controlling protein structure in successive generations would not by itself lead to the evolution of animal species. For such evolution to occur, variations have to exist. One way in which these variations can arise is by mutational events —gene mutations—such as the one just described in sickle cell anemia. Other types of gene mutations are possible. Mutated genes are just as faithfully replicated and carried on to succeeding generations as are the original normal genes. The selective pressure exercised by natural selection on an animal species can then operate on the phenotypic effects of gene mutations, that is to say, on the effects of abnormal proteins or abnormal enzymes on the biology of the whole animal.

Effect on Whole Organism

To return to sickle cell anemia, we can discuss the phenotypic effects of the possession of the abnormal hemoglobin S. The first effect seems to be that this abnormal hemoglobin has an unusually low solubility in aqueous solution. As a result of this property, hemoglobin S in the red cells of individuals suffering from the homozygous sickle cell anemia will precipitate inside the cell under conditions where oxygen has been given up by the hemoglobin to the tissues, such as in the capillaries. The precipitation of hemoglobin S leads to the distortion of the normally round red cells, producing sickle-shaped cells, from which the disease takes its name. As long as the red cells are in an oxygen-rich environment, hemoglobin S stays in solution. When the amount of oxygen is reduced, either artificially as in a test tube or in the tissues, the hemoglobin protein inside the red cell precipitates to form aggregates which distort the cell to the sickle shape. This is apparently not true crystallization, but rather the aggregates are

PROFESSOR INGRAM *gave an especially engrossing report as the first lecturer at the M.I.T. Alumni Seminar in the Kresge Auditorium Little Theater last September, and prepared this summary of it for The Review's readers. He came to the Institute in 1958 from appointments at Birkbeck College, London, and the Medical Research Council in Cambridge, England.*

bundles of two-dimensional arrays of molecules. Although we know now the chemical alteration which characterizes hemoglobin S, the chemical and structural explanation of the low solubility of this molecule still escapes us.

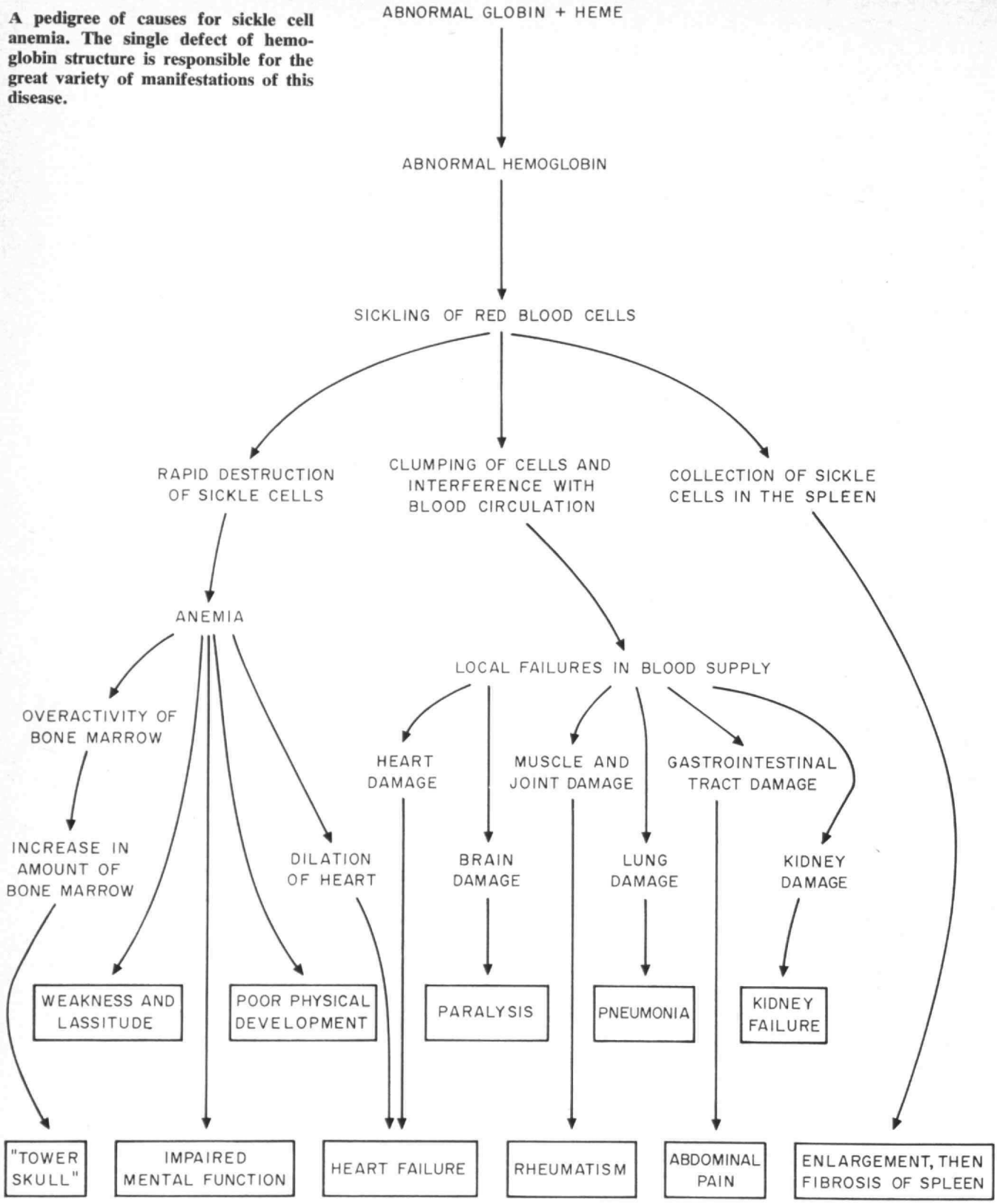
It remains to be seen whether all aspects of the clinical picture of sickle cell anemia can be explained solely in terms of the chemical abnormality of the hemoglobin S molecules or whether there is also some interaction of the chemically abnormal protein with other factors.

At the next level of interaction, the sickled cells tend to block the circulation in the capillaries thereby cutting off blood from some areas of the body. The sickled red cells are rather fragile and break quite easily; therefore, a very severe hemolytic anemia results, which is to some extent compensated by the production of extra numbers of red cells from the bone marrow of the individual. In other words, the organism reacts against the disease producing characteristics of the abnormality, in this case against the loss of red cells through hemolysis. The capacity of the blood forming organs is, however, not sufficient to compensate for the loss of red cells through hemolysis, so that the counteraction by the organism is not efficient enough. The table on the next page shows many of the clinical manifestations of the disease; clearly, many major effects have come from the apparently trivial alteration, one amino acid differing out of 280.

Effects in Human Populations

The gene for hemoglobin S occurs with high frequency in the central belt of Africa where there are many areas in which 20 to 30 per cent of the population are carriers of the disease and have the sickle cell trait. One may wonder why such a disease should occur with such high frequency, since the severe anemia is so lethal, particularly in the primitive conditions of Africa. Individuals die of sickle cell anemia not just because of the disease itself but of the many complications to which they become susceptible. In a population where there are large numbers of individuals with the sickle cell trait (the heterozygotes for hemoglobin S), the probability of two such individuals marrying and having chil-

A pedigree of causes for sickle cell anemia. The single defect of hemoglobin structure is responsible for the great variety of manifestations of this disease.



dren with the severe sickle cell anemia is, of course, very considerable. Since these children do not reach the productive age, one would expect the gene to die out rapidly.

Clearly, this is not what happens, and some explanation has to be found for this curious phenomenon. One possibility is that the mutation of the normal hemoglobin gene to the hemoglobin S gene occurs very often. There is no evidence at all for this idea and it is considered rather unlikely in view of all the other known data on the frequency with which gene mutations occur in human populations. Some quite extraordinarily high mutation rate would have to be postulated. The second possibility is that the carrier of the disease, the sickle cell trait individual, who does not suffer greatly from

(Continued on page 52)

Our Understanding of Perception

The challenge today is to give insight into the mind and recent discoveries have helped

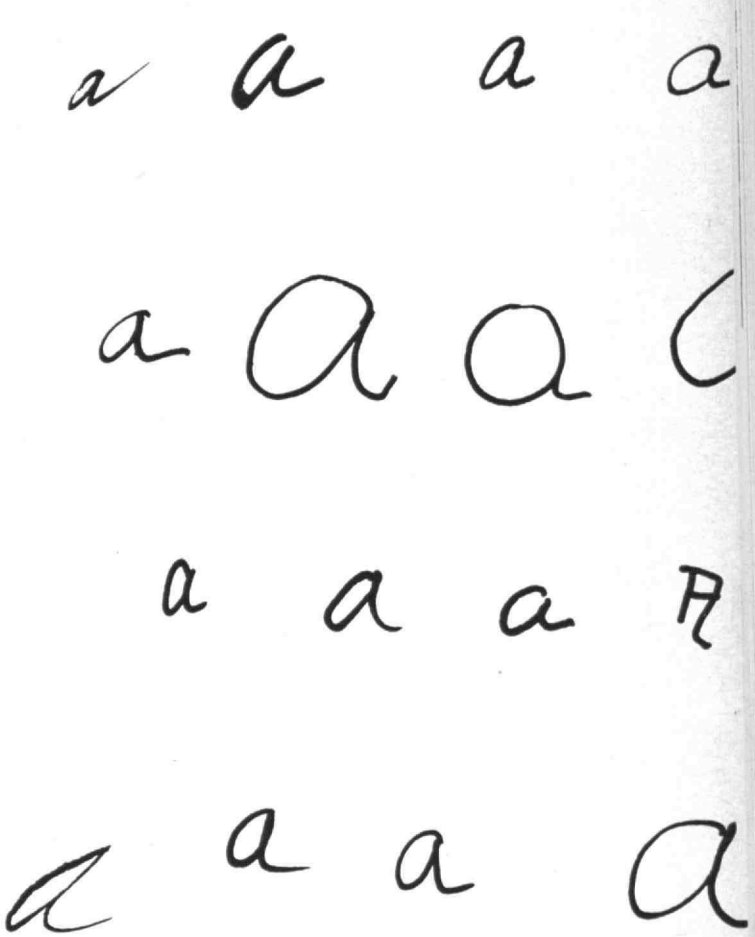
BY RICHARD M. HELD

Professor of Experimental Psychology

THE DICTIONARY tells us that "to perceive" means "to be acquainted with objects through the senses." To most of us this ability seems so obvious and its performance so immediate that we find it difficult to believe that there could be anything problematic about it. Why then have scientists of great talent puzzled over perception for many centuries and why in recent years have psychologists, neurophysiologists, engineers, and other professionals put so much effort into attempts to solve problems of perception?

Consider the markings on this page. Few viewers will fail to recognize them as examples of the letter *a*. But note the variations that have been overlooked in considering them all as *a*. Within considerable ranges, size, slant of strokes, and shape have been discounted. Even breaks in the figures prove irrelevant. If we were to take a continuous sample of script writing we might find that taken singly an example of *c, d,* or *o* might be indistinguishable from one of *a* because of such variations. Yet the reader will make no mistakes because of the context of surrounding letters which determine that only one of the letter interpretations may form either a word or a word appropriate in the larger context of a sentence. Are these recognitions as simple as the ability of the reader makes them seem? One answer comes from a comparison with the achievement of computer-aided recognizing machines.

Professors Murray Eden and Morris Halle of M.I.T. devised a characterization of Latin script which takes a fairly small number of features—pen strokes to be exact—and by the application of simple rules of combination generates all the letters of the alphabet. When their system was programed into a rather large computer, 80 per cent of a sample of carefully written words could be recognized at the rate of one word per 10 seconds. Although this is a considerable feat for a machine, the great superiority of the human recognizer is obvious. Moreover, we must realize that the recognition of script writing is simpler by many orders of magnitude than a task such as the recognition of speech.



The achievement exemplified by this form of recognition is of a very general type that psychologists refer to as "stimulus equivalence." A very simple case of such equivalence is the observation that a circular disc appears circular despite tilts which make its projected shape elliptical. Another case is our ability to recognize a familiar face viewed from innumerable angles, including many from which we have probably not previously viewed the particular face. Examples of stimulus equivalence raise central problems in the field of perception.

The potentialities of pattern recognition by machines motivate technologists interested in perception. Consider the possibilities of automation if efficient machine recognizers were available. Automatic sorting devices

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PROFESSOR HELD's recent research has been concerned with human performance under conditions of reduced and abnormal sensory input related to restriction of body movement—as, for instance, in a space capsule. This article is a summary of his lecture at the M.I.T. Alumni Seminar session on "The Mind of Man."

of all sorts, map readers, speech typewriters, and so on all await development of efficient recognizing systems.

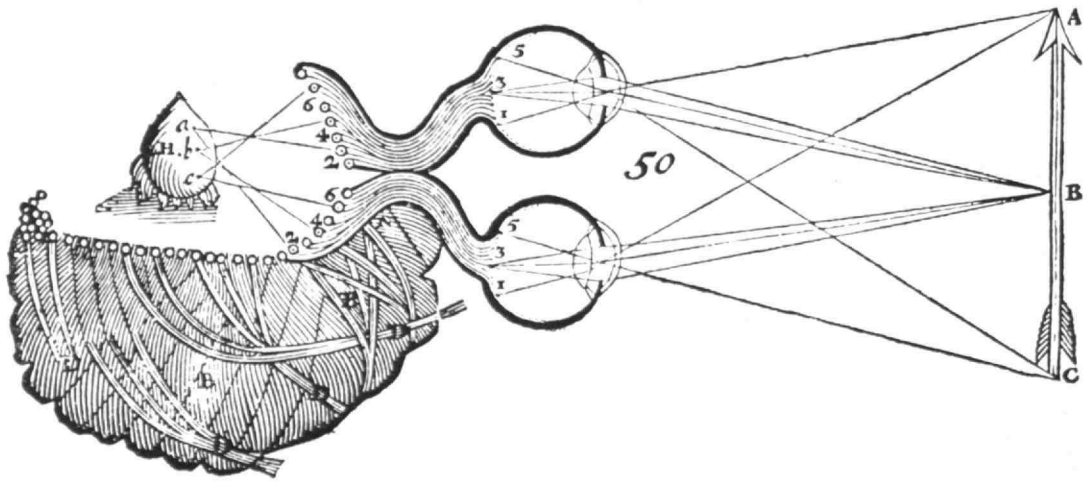
Whatever may be the level of achievement of computer-assisted recognizers, we have no assurance that the human perceptive apparatus works in the same manner discounting, of course, the differences in "hardware." The differences in efficiency alone raise considerable doubt. How are scientists approaching the task of finding out how the human perceptual system does in fact work?

Our approach to perceptual problems has its roots in ancient times. These problems began when a distinction was first made between a material world independent of the perceiver and the latter's representation of this world. When the eyelids are closed the visible scene is blotted out only to reappear when they are opened. This elementary observation implies that some process goes on between eye and object. One early theory asserted that objects threw off replicas of themselves which entered the eye. It seemed apparent that the eye must have access to a copy or representation of things in the outside world. Otherwise, vision could not be trusted as a source of knowledge of the world. The theory of light stated that light reflected from objects entered the eye. But how that light managed to carry a representation of the object to the eye of the perceiver puzzled scientists for more than a thousand years. It was not until the great Johannes Kepler propounded the correct theory of image formation by a lens—and, in particular, by the lens of the eye—that this ancient question of perception was resolved.

Even in the time of Kepler there were notions that the connections between eye and brain were material and acted as a further medium of transmission. How then could a faithful representation of the image formed on the back of the eye (retina) be transmitted higher up in the brain to the ultimate seat of sentience? Descartes, that universal genius of the Sixteenth Century, proposed an answer that served as a model until our own era. Conceiving of the optic nerve and connected parts of the brain as a bundle of transmitting fibers, he depicted them as carrying a point-for-point representation of the retinal image all the way to the pineal gland which he considered to be the connecting point of brain and mind. In his model, an object casts inverted images on the two retinae, which are then transmitted through the optic tracts in such a manner as to form an accurate, upright, and single representation.

The point-for-point projection which preserves correspondence with the object has dominated thinking about the visual nervous system up to our own time. But at the same time it is responsible for the problematic aspect of stimulus equivalence. For if a precise representation of the retinal image is carried to the perceiving center, then how can different representations be seen as the same entity? Why are different perspectives recognized as originating from the same object? The demand for preserving likeness and correspondence in transmission of information from object to eye and thence to brain leads to the dilemma over how disparate projections can be assigned to the same object or category: the problem of stimulus equivalence.

What are promising approaches to our understanding of these perceptive mechanisms? One of the most exciting among recent discoveries is the evidence for feature detectors discovered by neurophysiologists. Contrary to the Cartesian model of the visual nervous system, the existence of these detectors suggests that at a very early stage in the transmission of information from the retina to higher centers, simple correspondence with the retinal image is lost and replaced by an analysis of gross features. Professor Jerome Lettvin, '47, and his colleagues here at M.I.T. using electrophysiological techniques have discovered that certain single cells in the retina of the frog will respond selectively to a dark spot moving across the retina and to little else. They called these cells "bug detectors" to indicate their usefulness to the animal. Along similar lines two investigators at the Harvard Medical School, David Hubel and Torsten Wiesel have found evidence for feature detectors in the visual nervous systems of mammals. They do not have quite the abstractness of the frog's detectors but instead are sensitive to straight edges of particular orientations in the field of vision,



In Descartes' model, which served until our own era, objects cast inverted images on the retinae, that were transmitted to the pineal gland (H) to form an accurate representation (abc).

to corners moving in particular directions and to similar geometrical entities. The discovery of these feature detectors radically alters the model of the visual system originally depicted by Descartes. It validates the approach of computer-aided recognition devices of the type which use such detectors and it gives us new ideas about the organization of the nervous system.

An approach not unrelated to that of neurology is the comparative study of animal perception. By studying the perceptual capacities of various species of animals and correlating these findings with differences in their neuroanatomy and neurophysiology, we can hope to gain insights into the function of the various parts and processes.

One perennial question under study is that of just which aspects of the perceptive mechanism are built in and which are subject to development and modification by environmental influence. The classic procedure for such studies is to rear animals from birth under conditions lacking just those environmental factors that are suspected of being crucial for development. Although this method has its pitfalls it has produced some interesting information. One such bit of information comes from an experiment performed in our laboratory by Alan Hein and myself. Two kittens were yoked together so that one kitten was free to walk and the other held passive in a gondola. From birth on, these kittens were exposed to light only when in the apparatus. After several months we found that the kittens who had experienced only passive movement were markedly deficient in visually controlled behavior compared to the active kittens, although the latter rapidly recovered normal function when given their freedom. We have concluded that movement-produced visual stimulation is essential for the development of these forms of behavior. Apparently, movement with its accompanying change in visual stimulation allows the organism to take advantage of certain invariances entailed in its relation with a stable environment. Equivalence classes of perspectives corresponding to real objects in space may be developed out of this sort of environmental contact.

Finally, the importance of various types of theoretical models of the perceptive mechanism should be emphasized. These range from computer-aided recognizing systems to theories of language. Such models provide analogues for the operation of mechanisms and are productive of hypotheses and new experimental ideas quite apart from their practical uses.

Both historically and logically advances in our understanding of perception are tantamount to a gain in understanding the mind of man. Historically, the problems of perception for which investigators had no conceivable model in material processes were assigned to mind. Stimulus equivalence can be regarded as a prototype of the kind of intellectual functioning that goes into higher forms of reasoning and the making of scientific theories. The challenge of this field of investigation is that of gaining insights into mind. To the extent that we can gain precise understanding of mind we can embody its function in machines.

Some Rules Of Language

To talk, we perform abstract manipulations that disclose a key aspect of the mind's work

BY MORRIS HALLE
Professor of Modern Languages

DR. HALLE followed Dr. Held on the M.I.T. Alumni Seminar program, and a condensation of his lecture follows. Dr. Halle came to the U.S. from Latvia in 1940 and to M.I.T. in 1951. He has studied and written on speech analysis, language fundamentals, and the sound patterns of language —particularly of Russian.

ALTHOUGH language can be characterized in many ways, one productive way of viewing it is as a skill which everyone who has command of a language possesses. This skill is in part muscular, for during speaking we move our vocal organs in characteristic ways which differ to a certain extent from language to language. The acrobatics of the vocal organs, however, are but a small part of the skill that is involved in speaking. A much more important component of this skill is the ability to perform abstract symbolic manipulations of a certain type which may be likened to the computations involved in deriving a theorem from some axioms. These symbolic manipulations pervade all aspects of language from the most abstract syntactic operations to the rules governing the production of sounds.

In English, the letters *p, t, k* are pronounced with a noticeable puff of air (technically known as aspiration) if the following vowel is stressed; however, if an *s* precedes the *p, t, k* in the same word, the puff of air is absent. Thus, for example, in the word "pot" *p* is pronounced with a strong aspiration, but in the word "spot" the aspiration is absent.

The absence of aspiration cannot be attributed to the fact that an *s* immediately precedes the *p* in "spot." We see this readily if we examine phrases such as *rice pot* and *high spot*. Since these phrases are normally pronounced without pauses corresponding to the space between words, the *p* in both phrases immedi-

ately follows an *s*. Yet in *rice pot* the *p* is aspirated, whereas in *high spot* the *p* is not aspirated. The presence or absence of aspiration is correlated with the fact that in one case a word space intervenes between *s* and *p* whereas in the other case there is no word space there. In neither case, however, is the word space itself directly actualized by a pause. We must, therefore, assume that prior to pronouncing phrases such as *rice pot* and *high spot* the speaker performs a computation which tells him to aspirate the *p* in the first case and not in the second case. But how does the speaker know to do this? Being a speaker of English he knows the rules (axioms) for forming correct English utterances and among these rules is the one:
► *p, t, k* are aspirated before stressed vowel, unless preceded in the same word by *s*.

It may be urged in opposition to the account we have given here that speakers perform no computation at all, but rather reproduce the utterances from memory; i.e., they remember that "pot" is pronounced with an aspirated *p* and "spot" with an unaspirated *p*. This view, however, is not tenable because the same performance can be observed when speakers of English are asked to read words they have never heard before, such as "pavin" (stately old dance) or "spavin" (a disease of horses); or nonsense words; or when they begin to read a foreign language in which the English rule does not apply.

The rules of language govern not only the way in which a speaker pronounces different sounds in different contexts; these rules determine—at least to a certain extent—what elements (words or morphemes) appear in the utterance and also the order in which they appear. Consider, for instance, the sequences:

you ask me *you ask him* **you ask you*

The last of these is not a proper English sentence; in its place we have *you ask yourself*. As observed in Technology Review, February, 1964, page 19, the reason for this is the so-called "reflexive" rule of English which in part may be stated:
► When in a sentence both subject and object are pronouns and refer to the same person, add "self" after the object pronoun.

This rule automatically converts *you ask you* into *you ask yourself*. Observe, moreover, that reflexive pronouns do not appear in sentences of this type unless subject and object are identical. Thus there is no **you ask myself* or **you ask himself*. This fact further supports the proposed account, in which sentences with reflexive pronouns are derived from underlying sentences without reflexive pronouns, for only in sentences in which subject and object refer to the same person can a reflexive appear.

The important role that transformations of sentences of this type play in the functioning of language may be further illustrated by an examination of imperative sentences. Here we have:

ask me *ask him*

but not

**ask you* **ask myself* **ask himself*

Just as in the case of the declarative sentences examined above we find only one reflexive, namely *yourself*. We could, therefore, give a very simple rule for forming the imperative—i.e., delete subject *you*—if we assumed that imperatives were derived not from any kind of sentence, but rather only from sentences in which *you* is the subject. The idea that imperatives are special transformations of declarative sentences with a *you* subject, however, does more than permit a simple rule for the imperative. It immediately accounts for the fact that imperatives are always understood to refer to a *you,* which is not, however, explicitly present in the sentence. This 'understood' *you* is quite unusual. A verb without an expressed subject is not normally 'understood' in this manner. Thus, for instance, in *Asking him for it was John's biggest mistake* the 'understood' subject of the verb *asking* is *John* rather than *you.*

A person having command of a language must be presumed to have mastered a large number (perhaps a thousand or even more) rules of the above kind. The surprising thing is that these rules are learned and utilized without noticeable difficulty by all normal, and many subnormal children. That three year olds can even begin to master such complex rules can only be understood if we assume that children are prepared for this from birth. After all, when faced with considerably simpler tasks, most children are at a loss. The only plausible explanation is that children are born with the innate capacity for learning and utilizing language.

This innate linguistic capacity is clearly an essential component of man's intellectual equipment. To understand what is involved in speaking is, therefore, also to understand an important aspect of the workings of man's mind. In this sense it is quite true that language is the mirror of man's soul.

Aids to Keeping Up

STEADILY increasing knowledge is both advancing technology and imposing new responsibilities, James R. Killian, Jr., '26, told a TV interviewer during the M.I.T. Alumni Seminar.

Collateral reading recommended by the seminar faculty as aids to keeping up included:

The Brain, by Paul Chauchard (Dover, 95 cents).

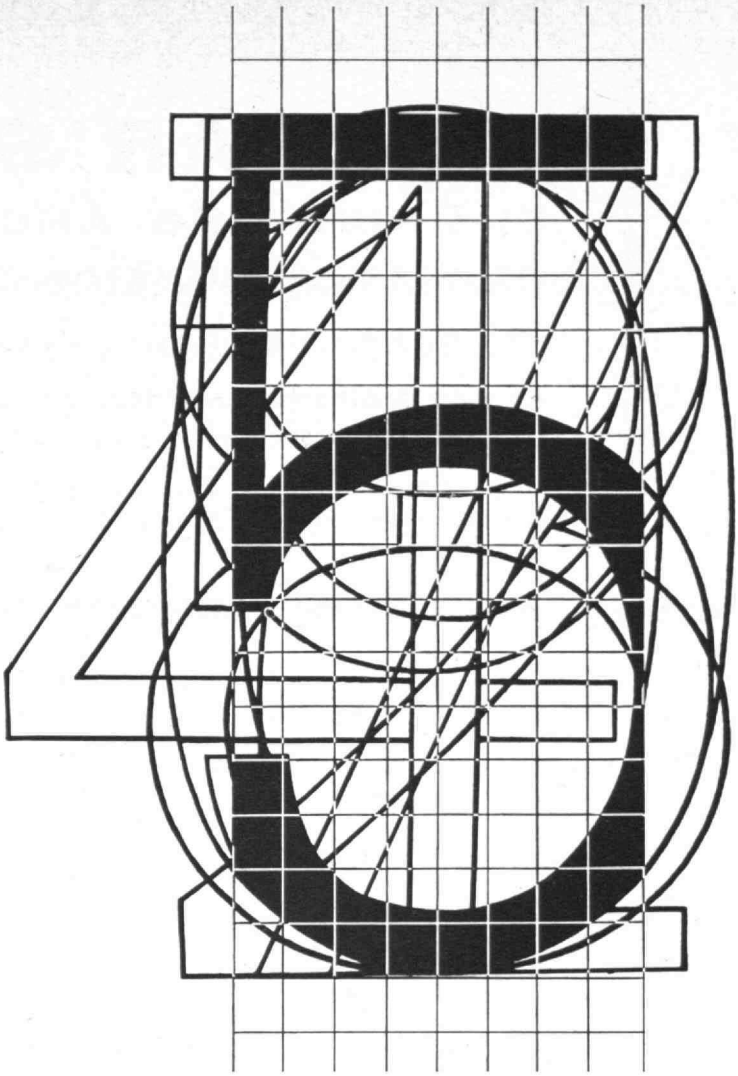
Return to Laughter, by Elenore Smith Bowen (Doubleday Anchor, $1.45).

The Phenomenon of Man, by Teilhard de Chardin (Harper Torchbooks, $1.75).

The Computer and the Brain, by John von Neumann (Yale paperbound, $1.45).

The Next Development in Man, by Lancelot Law White (Mentor paperback, 60 cents).

Knowledge and Wonder, by Victor F. Weisskopf (Anchor paperback, $1.45).



What tells the machine, "I am a 5"?

Designing recognition logic is a key to developing systems for recognizing handwriting, multifont printing, or magnetic-ink characters. Engineers face the questions: What minimum information must the scanner sense from a character, and what measurements are necessary to ensure accurate recognition?

There are a number of aspects of character recognition you might work on: computer simulation of new recognition logic, investigation of the probability of accurate recognition for different styles of writing or printing, or development of new methods of scanning the characters.

The field of character recognition and associated areas such as document handling could be of great potential for you at IBM. Write to Manager of Employment, Dept. 615Z, IBM Corporate Headquarters, Armonk, New York 10504.

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Individuals Noteworthy

(Continued from page 10)

New Posts

NAMED in the news of promotions, elections, and appointments were:

Benjamin H. Bristol, '19, and *John G. Truxal, '47,* respectively, as an Honorary Member, and as President-elect-Secretary, the Instrument Society of America . . . *William H. MacCallum, '24,* as Executive Vice-president, Modern Talking Picture Service, Inc. . . . *Marcellus B. McDavitt, '26,* as Director, First Merchants National Bank, Asbury Park, N.J.;

Henry G. Houghton, '27, as President, Meteorology Section, American Geophysical Union . . . *Lenvik Ylvisaker, '27,* as Vice-president—Manufacturing, Continental Can Company . . . *H. F. Tomfohrde, Jr., '29,* as Vice-president, Tidewater Oil Company;

Jarvis M. Wilson, '30, as Vice-president—Operations, Rochester Telephone Corporation . . . *John N. Dyer, '31,* as Executive Vice-president, Airborne Instruments Laboratory, and Vice-president and Director, Cutler-Hammer, Inc. . . . *Frederic W. Nordsiek, '31,* as Vice-president, Sloan-Kettering Institute for Cancer Research;

George A. Fowles, '34, and *Robert D. Scott, '35,* respectively, as Vice-president—Marketing, and as Executive Vice-president, B. F. Goodrich Chemical Company . . . *Samuel Joroff, '34,* as Principal Planning Consultant, New York City Planning Commission . . . *Hans J. Lang, '36,* as General Manager—Operations, The Lummus Company;

Newton H. Hoyt, Jr., '37, and *Donald G. Robbins, Jr., '38,* respectively, as Treasurer, and as Head of Industrial Products Division, The Singer Company . . . *Milton Karr, '37,* as Director of Engineering, U.S. Steel Corporation . . . *Harold R. Seykota, '39,* as Chief Engineer, Selas of America (Nederland) N.V.;

Donald D. Scarff, '41, as Vice-president, General Electric Company . . . *Clarence E. Stevens, '41,* as Vice-president—Manufacturing, Homelite Division, Textron Inc. . . . *James K. Tyson, '41,* as Director, Naval Warfare Analysis Group, Center for Naval Analyses;

(Continued on page 42)

Individuals Noteworthy

(Continued from page 41)

Robert C. Seamans, Jr., '42, as an Honorary Member, Aerospace Medical Association . . . *Francis M. Staszesky, '42,* as Vice-president and Assistant to the President, Boston Edison Company . . . *Peter G. Volanakis, '42,* as President, Strathmore Paper Company;

Eugene E. Magat, '43, as Research Manager, Pioneering Research Laboratory, Textile Fibers Department, E. I. du Pont de Nemours & Co. . . . *Benjamin Parran, '43,* as Assistant Vice-president and Director, Development and Design Engineering Laboratory, Xerox Corporation . . . *Robert S. Reebie, '43,* as Vice-president—Planning and Development, New York Central System;

Charles L. Sollenberger, '44, as Assistant Director, Applied Research Laboratories, Allis-Chalmers . . . *Donald L. Stevens, '45,* as Director, Information Systems Department, Communications and Electronics Division, Philco Corporation . . . *Robert W. Kolb, '46,* as General Purchasing Agent, Dominion Textile Company, Ltd.;

Thomas P. Cheatham, '47, as Deputy Director of Defense, Research and Engineering, U.S. Department of Defense . . . *Raymond F. Baddour, '49,* as a Member, American Academy of Arts and Sciences . . . *Arthur D. Halenbeck, '49,* as Associate Director, System Operations and Test Office, Manned Orbiting Laboratory, Aerospace Corporation;

Louis G. Peloubet, '49, as Manager, Financial Controls Department, Socony Mobil Oil Company, Inc. . . . *John W. Korcz, '50,* as Vice-president—Manufacturing, Reynolds Aluminum Company of Canada Ltd.;

Howard S. Bryant, '52, as Manager, Process Engineering, Research and Technical Division, Socony Mobil Oil Company, Inc. . . . *William H. Feathers, '52,* as Vice-president, Union Carbide Corporation . . . *Richard P. Simmons, '53,* as Assistant District Manager, Republic Steel Corporation;

Roswell L. Derby, '54, as Vice-president, Forbes & Wallace, Inc. . . . *Niranjan M. Parikh, '54,* as Assistant Director, Metals and Ceramic

(Concluded on page 44)

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1964

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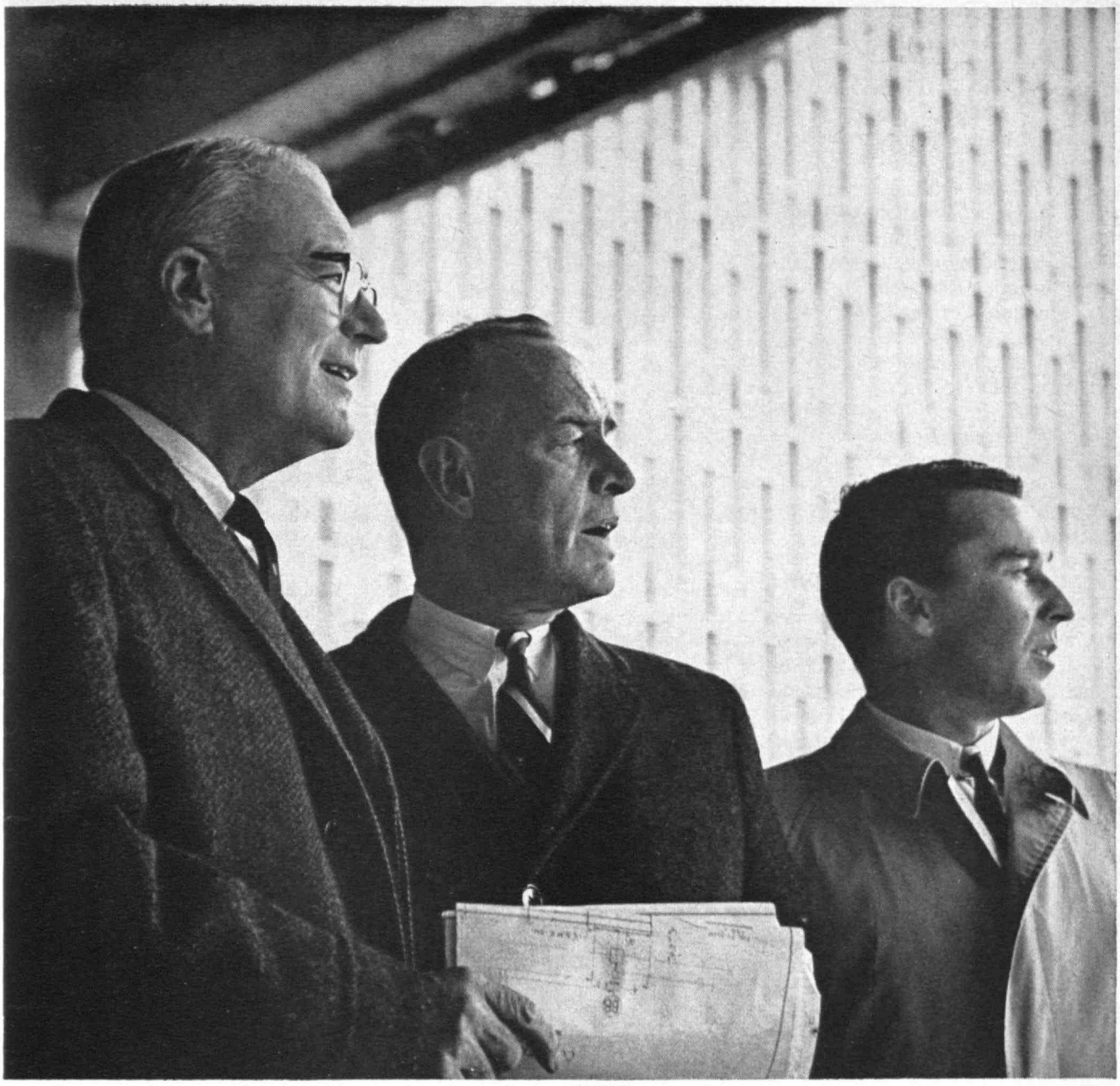


The Moving Spirit

MARK WHEELER, FLETCHER CHAMBERLIN and **GELDERT BROWN**, our Bank's Building Committee, share in the undercurrent of excitement which is beginning to mount throughout New England Merchants Bank. After seven long years of preparation, we are on the threshold of a new experience: just ahead lies the completion of our new Main Office in Prudential Center.

IN LESS THAN A YEAR, our own response to the quickening pace of Boston will be a reality. It's a heady feeling to be poised for this big adventure, but at the same time, we freely acknowledge that this step is much less important to you at the moment than it is to us. This message is simply in the nature of a progress report to our friends and neighbors.

OUR REAL IMPORTANCE TO YOU is only to be measured by what we do to help your business — or you as an individual — with financial aid and counsel. "The man you talk to" at our Bank can never forget this primary obligation... this promising opportunity. *This* is the moving spirit in our Bank.

WHERE THE MAN YOU TALK TO IS THE BANK

NEW ENGLAND MERCHANTS
NATIONAL BANK
Founded 1831 Member F. D. I. C.

Individuals Noteworthy

(Concluded from page 42)

Research Division, IIT Research Institute . . . *Robert L. Coble, '55,* as Vice Chairman, American Ceramic Society;

John M. Reynolds, '57, as Manager, Advanced Systems Department, Dynatech Corporation . . . *Raymond R. Ambrogi, '60,* as Manager—Forming Research, Technical Staff Division, Corning Glass Works . . . *Thomas A. Briner, '61,* as Assistant Professor of Architecture, University of Illinois;

David H. F. Liu, '61, as Supervisor, Chemical Engineering Research, Mobil Chemical Company . . . *Joseph R. Piselli, '63,* as Vice-president—Engineering, Bell Aerosystems Company.

Margaret Hopkins: 1896-1964

AN ASSISTANT to John E. Burchard, '23, until last July, Mrs. Margaret Hopkins, died on October 28. She came to the Institute in 1938, and officially retired as technical assistant to the Dean of the School of Humanities and Social Science in 1962.

Honors to Alumni

RECIPIENTS of recent awards and similar distinctions have included:

Earl R. Thomas, '22, the Walton Clark Medal by The Franklin Institute . . . *Walter Crafts, '26,* the Gold Medal (posthumously) by the American Society for Metals . . . *James R. Killian, Jr., '26,* an honorary Doctor of Humanities degree by Rollins College;

Elliot B. Grover, '28, the "1964 Man of the Year" Award by Phi Psi Textile Fraternity . . . *Gordon S. Brown, '31,* an honorary Doctor of Science degree by Dartmouth College . . . *Paul H. Robbins, '36,* an honorary Doctor of Engineering degree by Rose Polytechnic Institute;

Vladimir Haensel, '37, and *Frederic M. Richards, '48,* respectively, the Industrial and Engineering Chemistry Award and the Pfizer Paul-Lewis Award by the American Chemical Society . . . *Ju Chin Chu, '46,* the Gold Medal and an Honor Scroll by the Ministry of Education of Free China, Taiwan . . . Lt. Colonel *Thomas W. Lane, '53,* the Certificate of Achievement by the U.S. Army;

Stephen J. Lukasik, Jr., '53, the Ottens Research Award by Stevens Institute of Technology . . . *Niranjan M. Parikh, '54,* as one of "10 Outstanding Young Men" of Chicago area by the Chicago Junior Association of Commerce . . . *John B. Rogers, '54,* an Architectural Award by the Boston Arts Festival;

Ronald A. Rohrer, '60, a Certificate of Award for best original paper by the National Electronics Conference, Inc. . . . *John F. Banzhaf, 3d, '62,* the Second Prize in the 1964 Nathan Burkan Memorial Competition by the American Society of Composers, Authors and Publishers.

Alumni Day Planners

TO ASSIST Chairman *Ralph H. Davis, '31,* chairman, and *Francis M. Mead, '29,* deputy chairman, on the 1965 M.I.T. Alumni Day Committee, the Alumni Association has designated: William Baumrucker, Jr., '29, Arthur L. Bryant, '44, John T. Fitch, '52, Robert W. Forster, '35, Wolcott A. Hokanson, Claude F. Machen, '31, Philip H. Peters, '37, Charles H. Spaulding, '51, and Mrs. Kenneth R. Wadleigh.

New England Life agent Gordon E. Weston, University of Minnesota '49, discusses a personal life insurance proposal with St. Paul masonry contractor, Robert Larson.

Gordon Weston knows the secret word

After ten years of selling veterinary medicines, Gordon Weston had reached an impasse. His sales record was excellent, but there was no chance for advancement. Clearly, it was time to look for another career or settle for what he had.

Gordon decided on life insurance after considering several other fields. "I was convinced," he says, "that this business offered by far the greatest reward if I was willing to work hard to gain it." With a family tradition of New England Life service behind him (his father, Ray Weston, was a New England Life agent for over 30 years), he joined this company in 1962.

In October, Gordon celebrates his second anniversary with New England Life. How's he doing? His production for this period is well over the million dollar mark. He has already earned membership in the New England Life Leaders Association. And he can look forward to greater rewards for greater achievements—with no ceiling on advancement.

What does he attribute this record to? As he puts it, "There is only one secret word—*work;* there is only one result—*success.*"

If this type of career with New England Life interests you, there's an easy first step to take. Send for our free Personality-Aptitude Analyzer. It's a simple exercise you can take on your own in about ten minutes. Then return it to us and we'll mail you the results. (This is a bona fide analysis and many men find they cannot qualify.) It could be well worth ten minutes of your time.

Write to New England Life, Dept. AL, 501 Boylston Street, Boston, Massachusetts 02117.

NEW ENGLAND LIFE

NEW ENGLAND MUTUAL LIFE INSURANCE COMPANY: ALL FORMS OF INDIVIDUAL AND GROUP LIFE INSURANCE, ANNUITIES AND PENSIONS, GROUP HEALTH COVERAGES.

THESE EASTERN COLLEGE ALUMNI ARE NEW ENGLAND LIFE REPRESENTATIVES

M.I.T.:
Arthur C. Kenison, '19, Boston
John H. Schaefer, '25, Hackensack
Stanley W. Brown, '36 South Hadley

NEW HAMPSHIRE:
John R. Hayes, '41, Boston
Robert W. Jacobs, '50, Manchester
Alan D. Rogers, '50, Manchester
L. Thomas Rand, '54, Boston
Edawrd T. Beauregard, '60, Hartford, Conn.

PENNSYLVANIA STATE:
Franklin D. Leffler, CLU, '34, Harrisburg
Howard E. Rein, Jr. CLU, '42, Montgomery
Richard N. McCord, '47, Honolulu
Joseph B. Newhoff, '47, New York
James R. Doughty, CLU, '52, Philadelphia
Vance L. Scout, '52, Harrisburg
Robert M. Ignatin, '58, Dallas
Donald B. Bahrenburg, '59, Buffalo
Robert L. Brier, '60, Pittsburgh

RUTGERS:
Norman Gray, CLU, '42, Phoenix
C. Donald Peterson, '63, Ft. Lauderdale

MAINE:
John O. McGillivray, '41, Boston
Albert F. Brady, '50, New York
Leslie S. Ray, Jr., '50, Salem
Walter F. Tweedie, '52, Miami
Ernest K. Khoury, '53, Bangor
Alphege J. Martin, '58, Sebago Lake

LEHIGH:
David Marks, Jr., CLU, General Agent, '32, New York
Robert E. Goodman, '42, New York
David L. Hume, '42, Birmingham
Berri G. Powers, '50, Pittsburgh
James N. Serphos, CLU, '54, New York
Henry W. Taylor, Jr., '56, New York

LAFAYETTE:
Roswell W. Corwin, CLU, General Agent, '25, New York
Frank J. McMullen, '25, New York
John L. Ritchey, '33 Harrisburg
Horace D. Olmsted, CLU, General Agent, '39, Rochester
Jack H. Scott, CLU, '40, New York
Wilbert E. Gehman, CLU, '41, Los Angeles
William E. Howard, '43, Miami
Harvey W. Russ, '51, Boston
Alan D. Crowley, '57, Charlotte
Thomas W. Corwin, '62, New York
David L. Atwater, '64, Boston

COLGATE:
Montague P. Ford, CLU, '18, Boston
Paul R. Ford, CLU, '23, Philadelphia
Asa F. Voak, CLU, '35, Cleveland
Carl L. Russell, Jr., '38, New York
Paul G. W. Anderson, Jr., '39, Worcester
John P. Morrell, '40, Chicago
Robert Oltmann, '41, New York
Jere D. Gilmour, CLU, '42, New York
Evans F. Spear, Jr., CLU, '43, Boston
David R. Ketelhut, '43, Plainfield, N.J.
Robert B. Armstrong, General Agent, '44, Philadelphia
Robert M. Orth, '48, Burlington, Vt.
George H. Auffinger, III, '50, Buffalo
Girard L. Clemons, Jr., '51, Jacksonville
Joel J. G. Lehman, '53, Miami
Charles B. Lockwood, '54, San Juan, P.R.
Raymond F. Smith, '54, Syracuse

JOHNS HOPKINS:
Jerrold Gottlieb, '59, Baltimore

Women in Science

(*Concluded from page 28*)

the choice of careers among several thousand women who were graduated from college in 1961. Only 7 per cent of them have elected long-range careers in "heavily masculine" fields such as the sciences.

The major characteristics of a scientist are high intellectual ability, extreme independence, low interest in social activities, and intense channeling of energy toward one objective, Dr. Rossi noted. But women strongly prefer fields in which they work with poeple rather than things. "If we want more women to enter science, then the implication seems clear that we must encourage the cultivation of analytic abilities which science requires. To achieve this means encouraging independence and self-reliance in young girls instead of pleasing feminine submission. A childhood model of the quiet 'good' sweet girl will not produce many women scientists."

History provides part of the answer to questions about discrimination against women in Federal jobs, according to Robert F. Mello, Director of the Office of College Relations and Recruitment of the U.S. Civil Service Commission. Ever since 1870, he said, there has been a law which was long interpreted as giving the Federal department heads the authority to hire women "if they wished," or men only. But since 1961 the commission has required that all but a few appointments be made without regard to sex.

"The nation's engineering endeavor is going through a period of major readjustment," Richard H. Bolt, of Bolt, Beranek & Newman, Inc., told the symposium. "Highly advanced technologies, stimulated in large part by international tensions, now are available to serve human needs in yet undreamed of ways; and the future (within this decade) will bring unprecedented industrial opportunities for thoroughly trained, first-rate engineers —including women."

President Julius A. Stratton, '23, welcomed delegates and visitors. Bruno Bettelheim, of the University of Chicago, gave the opening address. Mary I. Bunting, President of Radcliffe College and a member of the U.S. Atomic Energy Commission, was moderator of a panel whose members included Chien Shiung Wu, Nobel Prize winner and professor of physics, of Columbia University. Other panel participants included Wilma Kerby-Miller, Dean for Graduate and Professional Women Students in Harvard University. Lillian M. Gilbreth, a pioneer among women engineers, spoke as the first Webster-Mauzé Lecturer at M.I.T., and the closing address was given by Erik H. Erikson, of Harvard.

A Portrait of Our Planet

(*Concluded from page 25*)

a particular day a month or more in advance seem unlikely.

Smaller atmospheric motions of fronts and cyclones were discussed by Arnt Eliassen, of the University of Oslo. William C. Swinbank, of the Australian Commonwealth Scientific and Industrial Research Organization, spoke on atmospheric turbulence; he took the place of A. M. Oboukhov, of the Institute of Atmospheric Physics, Moscow, who was unable to attend.

One consequence of the earth's slowing rate of spin, as Dr. MacDonald noted, is that the moon is moving slowly away from the earth. The moon is also getting smaller in mass, according to Gerard P. Kuiper, of the University of Arizona, who played a prominent part in interpreting the pictures of the moon taken by Ranger 7. High-velocity particles from space are constantly "sandblasting" the moon, removing more material from its surface than is added by the particles themselves, he said. From the Ranger 7 photographs, which he showed at the conference, Dr. Kuiper concluded that the top one meter of the moon's surface is probably very spongy. Recent photographs of the moon taken at infrared and ultraviolet wavelengths show "provinces of color" that coincide with areas that Dr. Kuiper believes to be lava flows. These areas form many of the features of the lunar surface.

Cosmic dust accumulating on the moon would give the surface a uniform color; but the dark areas of the lunar seas are lava flows formed during the first 100 million years of the moon's history by radioactive heating from within the moon, he said. In response to a question, he said no new impact craters had been found on the moon's surface, probably because these craters are formed over a very long time-span.

The Lindgren Library in the Green Building is named after Waldemar Lindgren, Head of the M.I.T. Geology Department from 1912 to 1933. Adjacent is the Schwarz Memorial Map Room which honors Theodore E. Schwarz, '76.

As dependents of the sun, the earth and its moon interact with the interplanetary atmosphere in ways that may provide information about all three bodies, according to Ludwig Biermann of the Max Planck Institute for Physics and Astrophysics. Whereas scientists once thought the interplanetary plasma was static, they now believe that it flows through space at a speed much greater than the earth's—a theory that will be tested during the International Year of the Quiet Sun in 1965, he said. The second principal part of the interplanetary medium is the dust cloud originating from the comets, which constitute natural space probes.

Space vehicles have shown that as the supersonic solar winds flow past, the earth's magnetosphere—its shell of magnetic fields—builds up a shock wave ahead of it, Dr. Biermann reported. In addition, astrophysicists have now detected the wake of the moon in the solar wind. Knowing this, he said, it is possible that "hitherto undetected geophysical effects may result" when the wake of the moon again comes near the earth's magnetic field.

In studying the sun itself, the goal of solar physics is to construct a model of the sun that agrees with what is observed and with the known laws of physics, Leo Goldberg, of Harvard, told the conference. Although the solar atmosphere has generally "eluded theoretical understanding," he said, physicists have found a "striking relationship" between the sun's magnetic fields and the granular pattern that can be seen on the sun. The structure of these solar convection cells is apparently governed by the laws of magnetohydrodynamics; and physicists believe, he said, that the jets that emerge from the sun at supersonic velocities are visible examples of MHD shock waves. These jets or spicules appear to move along the lines of force of the solar magnetic field. On the basis of both theory and observation, it is now reasonable to suppose that solar flares represent the conversion of magnetic energy into thermal energy, Dr. Goldberg said.

Charles H. Townes, M.I.T. Provost, was chairman for the conference in Kresge Auditorium. Chairmen of the conference sessions were: "The Earth's Environment"—Bengt Strömgren of Princeton University and Professor John V. Harrington, '58, M.I.T.; "Atmospheric Motions"—Robert M. White, '49, Chief of the United States Weather Bureau, and Professor Henry G. Houghton, '27, M.I.T.; "Dynamics of the Oceans"—W. Maurice Ewing, of Columbia University, and Columbus O'D. Iselin, Woods Hole Oceanographic Institution and M.I.T.; "The 'Solid' Earth I"—J. Tuzo Wilson, University of Toronto, and Professor Raymond Hide, M.I.T.; "The 'Solid' Earth II"—Sir Edward C. Bullard, University of Cambridge, and Professor Patrick M. Hurley, '40, M.I.T.

There's Been Some Mistake

An explanatory communiqué from Polly Park of Philadelphia

DEAR EDITOR:

You have no idea how transformed my life has become since my name was recently published, along with a thousand eminent scientists, in the Technology Review Index of Contributors for November, 1963, through July, 1964.

Never mind that my sole contribution to your distinguished magazine was an article entitled M.I.T. AND ME, published last December, wherein I described how an average housewife with a mathematical potential of 3.2 (third grade, second month) manages to converse with top scientists at the M.I.T. Club of Philadelphia dinner meetings, which I frequently attend with my husband (M.I.T. '40)—This fact has gone unnoticed. Instead, Park, Polly—has been added to the mailing lists of every scientific journal in the country. In short, I am *in*.

Overnight I have been swept from the world of car pools, vacuum cleaners, and fish sticks to that other world of slide rules, radar, and computers. I now walk the same lonely path as the giants of our time—Edward Teller, Wernher Von Braun. . . . Together we share the responsibility for the future of mankind and the burden that we carry is intolerable.

Letters arrive daily informing me that advance copies of *Digital Computers, Lunar Soundings,* and *Abstract Decimals* are winging their way to me for my personal perusal. Letters such as this one:

"Dear Madam,

"Your interest in mathematics has prompted us to send you postpaid, our latest publication entitled *The Square Root of St. Louis*. This work is destined to become the most widely read reference book of our day. A *must* for physicists like yourself.

"Before publishing this masterpiece, we would appreciate your comments, for which we have enclosed a self addressed envelope.

Sincerely yours,"

At the present time I am plowing through the fourth one of these and for the life of me I can't think of a thing to tell that man other than what I told the others; that the book's just too long and heavy (don't ask me where it should be cut, I'm not a mathematician, that's their job).

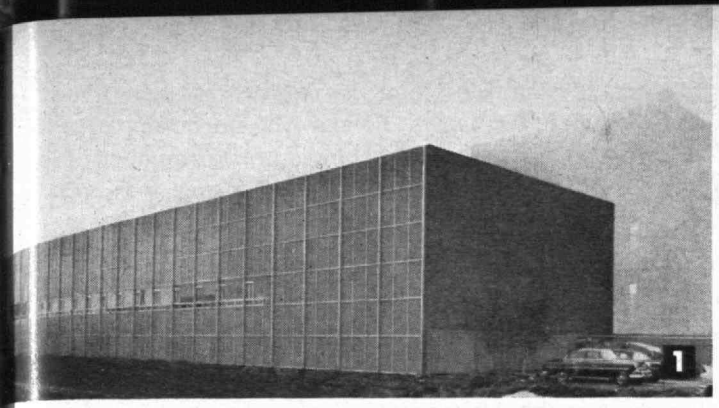
Books aren't the only things I receive in the mail lately. The other day I ran excitedly up from the mailbox with a long brown box, certain to be the new carving set I had ordered from Hammacher & Schlemmer. Imagine my disappointment when I opened it and found the contents to be a Decimal Log Log Slide Rule, also sent for my approval with a card attached for comments. I felt it my duty to inform those manufacturers that their product would be short-lived if someone didn't eliminate that second "Log." You'd think they'd have noticed that themselves!

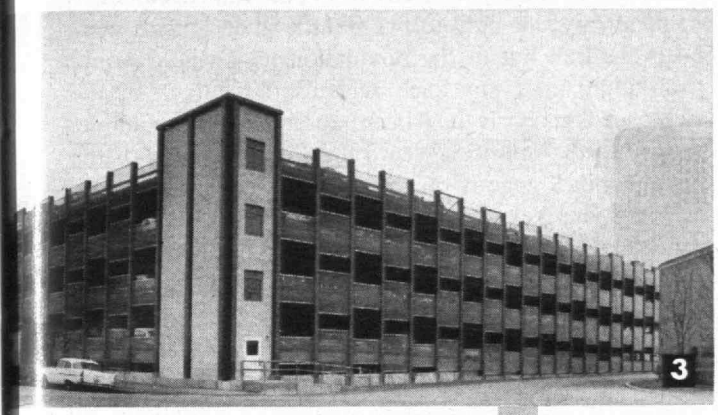
But, worst of all, there's been a noticeable coolness in the attitude of my husband towards me lately. While a staggering load of scientific data comes addressed to me daily—nothing but bills come to him. But then as I told him the other day, I don't imagine those publishers are interested in a man who has limited his field to antennas and towers—when a freethinker like myself is available. Don't you agree?

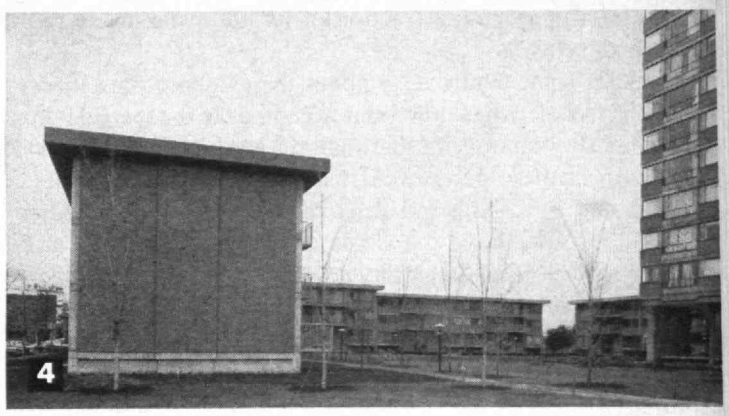
Sincerely Yours,
Polly Park

P.S. For goodness' sake don't publish this letter or I'll have all that scientific stuff coming in for another year!

FRANKI FACTS



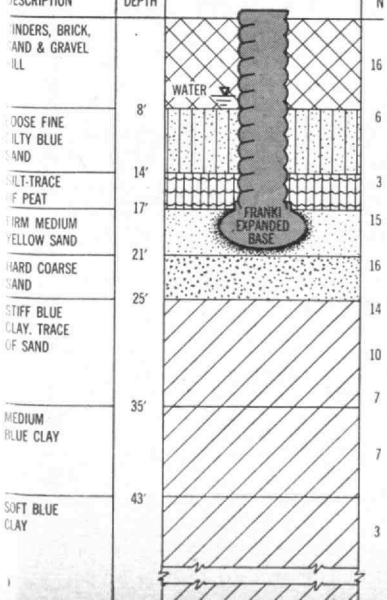




STRUCTURE	1. Dupont Athletic Center	2. Burton-Conner Dining Hall
ARCHITECT	Anderson Beckwith & Haible	William Hoskins Brown Assoc.
ENGINEERS	Severud-Elstad-Krueger Assoc.	Hayden, Harding & Buchanan
GENERAL CONTRACTOR	George A. Fuller Company	Kirkland Constr. Company
NUMBER FRANKI UNITS	215 cased	47 cased shaft

STRUCTURE	3. Parking Facilities	4. Married Students Quarters
ARCHITECT	Parking Development Co. Carlton N. Goff	Hugh Stubbins & Assoc.
ENGINEERS	Maurice A. Reidy	Wm. J. LeMessurier & Assoc. Inc.
GENERAL CONTRACTOR	John F. Griffin Company	Wexler Construction Company
NUMBER FRANKI UNITS	174 uncased	102 uncased

TYPICAL SOIL PROFILE
DUPONT ATHLETIC CENTER



Franki Foundations at M.I.T.

Problem

One of the major problems encountered by Massachusetts Institute of Technology as it expands its facilities to meet the increasing demands of the Space Age, is the selection of safe and economical foundations. The campus is underlain, typically, by about 20 feet of fill and peaty silt, a crust of sand and gravel of varying thickness, and the deep deposit of soft blue clay common to much of the Boston area.

At the David Flett du Pont Athletic Center (No. 1) it was decided to support the building on the crust. Since the sand layer varied from 8 to 12 feet in thickness, piles were subject to the objection that they might "punch through" to the clay, and an excavated caisson foundation would have to bear the heavy and indeterminate cost of large-scale dewatering.

Solution

The Engineers decided to investigate the Franki system of displacement caissons or pressure-injected footings, because of Franki's unique ability to forge a footing with 140,000 ft.-lb. blows at a predetermined depth in the top of the sand layer, creating both an expanded base and a large zone of densified sand, thus improving the natural "mat" action of the crust. They found that Franki was prepared to guarantee satisfactory installation of the caissons at a fixed lump sum price, eliminating contingencies for extra length or dewatering.

The Engineers' final design involved 215 Franki caissons, in groups of 2 to 6 units, carrying individual loads of 65 to 80 tons. The controlling factor was of course the stress applied to the clay, and the number and spacing of the caissons at each column was so arranged as to keep that stress relatively constant, and within the limit of 1 ton per sq. ft. generally accepted for soft Boston Blue Clay.

A load test to double design load in the most critical area, where the sand stratum was only 8 feet thick, (net settlement 0.24") proved the safety of the design.

Results

The du Pont Athletic Center has now been in service for four years, and the design assumptions have been fully confirmed.

In the meantime the Institute and its various professional consultants, listed at left, have specified Franki guaranteed lump-sum-price foundations on the Burton-Conner Dining Hall (No. 2), the large Parking Facility at Main & Vassar Streets (No. 3), and on the four low-rise buildings of the Married Students Quarters complex (No. 4), now being dedicated. Unit loads on these structures ranged up to 120 tons per caisson.

Franki is proud to have been able to contribute to the growth of this dynamic educational institution.

FRANKI
FOUNDATION COMPANY
103 PARK AVENUE, NEW YORK 17, N. Y.
916 STATLER OFFICE BLDG., BOSTON 16, MASS.

Literature — This series of job highlights, as well as other descriptive literature, will be sent to you upon request to Franki Foundation Company, 103 Park Ave., New York 17, New York

Man as a Living Organism

(*Continued from page 34*)

his condition, has indeed a selective advantage *in his particular environment*. It was postulated some time ago by Allison, elaborating an earlier idea of Haldane's, that the sickle cell trait individual was more resistant than the genetically normal person to malaria in the form endemic in central Africa. In particular, he should have fewer malarial parasites in his blood. We should note in passing that the parasite which causes malaria must pass a fraction of its life cycle inside red blood cells.

After some controversy about the evidence presented, Allison's view has now been accepted. It is especially in the early years of life that malaria is a very killing condition in these parts of Africa and it is at this time of life that the sickle cell gene protects. In other words, children who have the sickle cell trait constitution are less susceptible to malaria and therefore possess a selective advantage. We seem to have here an explanation of why this gene for sickle cell anemia is so frequent in these areas. This state of so-called balanced polymorphism is a good example of this genetic phenomenon.

Evidence has now become available which shows that in certain geographical areas mothers who possess the sickle cell trait have a higher fertility than mothers with the normal genetic constitution. In fact, the ratio of the fertility of heterozygous sickle cell trait mothers to normal mothers is about 1.45, an impressively high number. It is hard to see at the moment just what the basis for these facts might be and why, for example, a heterozygous mother should show a greater number of pregnancies, but the data is rather convincing. It is not only in such cases that the number of pregnancies is higher but also, more interestingly, the number of live births is higher, giving an over-all selective advantage to the heterozygote.

It should be pointed out that these factors, such as the higher fertility of mothers with sickle cell trait, were measured in the African environment. Improvement in medical care not only to pregnant women and to newborn children but to the population as a whole would profoundly alter any such selective advantage of the sickle cell gene. It has been observed, for example, in the North American Negro that the frequency of the hemoglobin S gene is on the decrease, although a considerable number of generations are required before this gene will be reduced to a low frequency. Among American Negroes the existence of malaria as a selective factor has almost entirely disappeared, except in a few isolated areas.

The example of sickle cell anemia is only one of a number of such genetically controlled conditions. It seems safe to assume that what we can learn from this example can also be applied to a wide range of conditions, although it would be wrong to suggest that this kind of genetic phenomenon is the only way through which variations arise in the population. The mechanism

(*Concluded on page 54*)

Man as a Living Organism

(Concluded from page 52)

of balanced polymorphism is by no means the only way in which the genetic make-up of the population is affected.

In *conclusion,* then, we may say that in the study of the abnormal human hemoglobins, particularly the hemoglobin of sickle cell anemia, we can point to an instance where we can study aspects of the functioning of man as a living organism both at the molecular level and also at the level of the whole organism and even at the level of the human populations. At the *molecular level* we can learn the degree of exactness of genetic control over the fine chemical structure of a biological macromolecule. We can also study an example of the heredity mechanism which is fundamental to this control. At the *level of the whole human organism,* what is originally a molecular defect has affected the whole man; clearly, the organism reacts against this effect, however ineffectually. Finally, at the *level of the human population,* we can see how the environmental conditions interact with the genetic constitution of the individual and how changes in the environment can bring about changes in the genetic make-up of a collection of people. This is but a small beginning in the problem of bringing together our knowledge of what happens at the molecular level inside cells and our knowledge of the biology of the whole organism.

(Continued from page 27)

A New Clinical Research Center

A SMALL but complete hospital with associated chemical and biochemical laboratories was opened this fall in the Daggett Building to facilitate clinically oriented biological research at M.I.T. Dr. Nevin S. Scrimshaw, Head of the Department of Nutrition and Food Science, is acting program director of this new Clinical Research Center and Dr. Albert O. Seeler has final medical responsibility. It is the first such center outside of a full-scale hospital or medical school environment, and was made possible by a grant from the National Institutes of Health.

Six physicians have been enrolled in a new M.I.T. post-doctoral program leading to a Ph.D. degree in nutrition, and several of them are engaged in research which will be carried on at the center. The first specially selected, volunteer subject admitted was Michael Kirby, an Antioch College chemistry major, who is participating in a project directed by Dr. Scrimshaw and aimed at determining the protein and amino acid requirements of young men.

The center has 10 beds, but is designed for expansion to 17, and is to have an operating staff of about 30 persons, exclusive of research personnel. Dr. Lillian Pother Barlow, who has done both basic and clinical research in metabolism at the Peter Bent Brigham Hospital, the Harvard Medical School, and St. Luke's Hospital in New York, is assistant program director.

Greece as Many See It

ONE AFTERNOON this fall about 35 students and several professors gathered in Hayden Library Lounge and spent two hours and a coffee break talking about the achievements of ancient Greece, the topic of this year's Senior Humanities Seminar. In keeping with the special methods used in the seminar, the students are tackling a subject in company with several teachers. In this way, Professor Roy Lamson explains, a colloquy among scholars enriches the usual discussion between students and teacher.

Another objective is to cut down the barriers between the disciplines of humanities and science, and in exploring the "Greek Achievement" the students are hearing many points of view. Professor Giorgio de Santillana will lead sessions on Greek science and cosmology, Assistant Professor William Watson will talk about the economic background, and Assistant Professor David Berlew of the Alfred P. Sloan School of Management will discuss the subject from the perspectives of sociology and physiology.

"The effect is that each discipline teaches the other and we hope that the final result will be a more complete understanding," says Professor Lamson. Each year the seminar deals with a different topic. Previously the late Aldous Huxley joined the students in discussing "The Nature of Man," and Professor Howard Mumford Jones participated in a seminar on "Romanticism and Revolution." The topic next year will be "The American Achievement."

(Continued on page 58)

Sitting pretty in the picture is a '65 Corvair Corsa Sport Coupe

In a word, Turbo-Chaaaaaaaarged! '65 CORVAIR by Chevrolet

If you feel guilty about getting a '65 Corvair Corsa for its gorgeous looks, here's what you can tell your friends.

For one thing, there's a lot more engine. Corsa's standard Six—a 4-carb whirlwind—hits 140 hp. Corsa's ace-in-the-hole is another whirlwind with turbo-supercharger added. If you order it you get the massive blast of 180 hp right over the driving wheels. No wonder it feels like a lot more.

You've got some talking points in the suspension department too. Corvair's always been fully independently suspended. Now it's fully independent with link-type rear suspension—a little idea we borrowed from Corvette. It does Corvette-type things to road-holding and handling, just as we planned.

Then there's the Corsa's interior. All the right things—black crinkle-finish instrument panel full of recessed circular instruments, bucket front seats, plentiful room, a quicker and slicker 4-Speed Synchro-Mesh shift if you specify it. An atmosphere only someone who knows his way around sporting cars could create.

If your friends need more proof, mention that you can order a telescopic steering column, Positraction, AM-FM Stereo radio, air conditioning, and even a windshield-mounted compass.

After all this, if you still think they'll say you got a Corsa for its looks, relax . . . it's a compliment.

CHEVROLET

Chevrolet Division of General Motors, Detroit, Michigan

Trend of Affairs

(Continued from page 56)

The Frog's Olfactory System

A DESCRIPTION of the electrical process that occurs in the olfactory nerve when an odor is presented has been proposed by two M.I.T. researchers. Their findings show that the electrical signals in a single nerve fiber depend on two different sorts of receptor mechanisms. One increases the rate of firing, the other depresses that rate, and both are usually involved when an odor is given. The electrical actions of these mechanisms differ somewhat and the combination is not simple and linear.

The olfactory system presents a difficult problem in decoding, and the researchers emphasize that their work so far has dealt only with the signal-generating mechanism, not with identifying or breaking an odor code.

The researchers are Robert C. Gesteland, '57, of the Scientific Engineering Institute in Waltham and Professor Jerome Y. Lettvin, '47, of M.I.T. Their work was done in the M.I.T. Research Laboratory of Electronics with frogs as experimental animals and their findings were reported at the Northeast Electronics Research and Engineering Meeting (NEREM) in Boston.

They selected the first cranial nerve, or olfactory nerve, as the object of their investigations because of its comparatively simple connections, and recorded both the activity of single fibers and the average electrical activity of the frog olfactory mucosa before, during, and after stimulation with puffs of various odorants. By detailed analysis of a large series of these electro-olfactograms, Drs. Gesteland and Lettvin were able to piece together their concept of how the endings generate the electrical signals that indicate the arrival of an odorous substance in the nose. A basic key to the process, they reported, is that odorant molecules apparently alter temporarily the permeability of nerve membranes at the receptor sites.

Grants from Eastman Kodak

IN ADDITION to three research grants of $12,500 each, M.I.T. received an unrestricted direct grant of $6,000 this year from Eastman Kodak. The company made the latter on the basis of the number of graduates who joined it five years ago and are presently employed there. Harry M. Mahn, '56, Philip W. Jenkins, '59, and Walter E. Mallory, 3d, '59, were the Alumni whose service thus qualified M.I.T. for the grant.

The Spilhaus Space Clock

FOR ABOUT six centuries astronomers have been building astronomical clocks to mark off the rhythms of the universe as well as to count the hours and minutes. A new "space clock" of this kind has been designed by Athelstan F. Spilhaus, '33, Dean of the University of Minnesota Institute of Technology. The clock's special gearing turns discs that specify 19 aspects in the movement of earth, moon, sun, and stars.

(Continued on page 60)

Science and IDA

Washington is the decision-making center of the free world. In that center, IDA functions as a scientific adviser to the Department of Defense. Our working environment is the gray area of those major national problems where too little is known and too much is at risk to hazard an intuitive decision. IDA provides responsible DOD decision-makers with the scientific/technical input required to eliminate or lessen the areas of uncertainty.

Physical scientists . . . along with electronic and aeronautical engineers, mathematicians, operations researchers and representatives of many other disciplines . . . have put their minds to work at IDA. In a world in which the complexities and exigencies of our nation's defense and foreign policy continue to increase and grow more critical, IDA's programs must also continue to expand. In short, IDA finds itself in the position of requiring its own new input . . . from the nation's scientific and engineering communities.

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(Continued from page 58)

Food for Future Folk

IN THE Underwood-Prescott Memorial Lecture this fall, Chancellor Emil Marcel Mrak of the University of California at Davis described some challenges for the food scientist now that the relationship between farmers and food processors is closer:

► Engineers and viticulturists have trained grapes on an inverted "L" trellis, so that harvesting machines can mow them from underneath to remove the fruit, and now geneticists must develop grapes with particularly long stems so the mower will not cut the bunches.

► For the vegetable market, it would be helpful if someone would find a way to produce tomatoes high in solids, flavor, and color; make the entire crop mature at once; put rigidity into the stems so they would stand upright and could be picked by machine; and at the same time make them more rugged—almost like rubber balls—to stand the abuse of mechanization.

"I have wondered for several years," Dr. Mrak confided, "if the geneticist will ever reverse the picture with respect to concentration of fat in milk and eventually develop a new strain of dairy cattle that will produce milk rich in protein and low in fat." We would also be better off if we could produce pork with less fat and more solid meat, and some progress has been made in that direction.

If the population continues to grow, it may be necessary within a century, in Dr. Mrak's opinion, to go still farther and eliminate the middle man (the animal processor) by inducing farmers to produce alfalfa or other plants that can be made directly into protein products by plant processors.

New Books for Alumni

RECENT PUBLICATIONS likely to interest many M.I.T. men have included the following:

David Rittenhouse, a biography, by H. Brooke Hindle, '40 (Princeton University Press, $8.50).

Fundamentals of Microwave Electronics, by Marvin Chodorow, '39, and Charles Susskind (McGraw-Hill Book Company, $12.50).

Measurement Engineering, Vol. 1: Basic Principles, by Peter K. Stein, '49 (Stein Engineering Services, Inc., $15).

Milestones in Nutrition, by Samuel A. Goldblith, '40, of M.I.T. and Maynard A. Joslyn (Avi Publishing Company, $14.25).

Seurat and the Science of Painting, by William Innes Homer (The M.I.T. Press, $12.50).

Tomorrow's Weapons, by Brig. Gen. (Ret.) J. H. Rothschild, '42, formerly Director of the Chemical Warfare Service Laboratories (McGraw-Hill Book Company, $6.95).

Doubling the Plant

COMPLETION of the Cecil and Ida Green Building brought M.I.T. close to the mid-point of a $50,230,000 building program—the largest in its history. Other structures now under way include a $4,500,000 Student Center, the $6,000,000 Center for Materials Science and Engineering, a $5,800,000 building for the Center for Life Sciences, and the $3,000,000 Grover M. Hermann Building to house social sciences and management research. In the decade ending in 1967, it now appears, the Institute's physical plant will be approximately doubled.

(Concluded on page 63)

Business, shake hands with your future!

Business is facing real competition today—tomorrow it will be no easier.

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(Concluded from page 60)

Upcoming Alumni Gatherings

M.I.T. club meetings this and next month will include the following, about which further information may be obtained by consulting the secretaries:

Boston, December 10, luncheon at the Union Oyster House with Professor Richard H. Bolt speaking on "Watch That Computer"; and luncheon, January 14—Bruce B. Bredehoft, '56, Secretary, 16 Millbrook Rd., Westwood, Mass.

Washington, December 28, student alumni luncheon—Merlyn J. Block, '41, Secretary, 6412 Ruffin Rd., Chevy Chase, Md.

Rochester, December 29, Christmas luncheon with Professor Ross H. Smith speaking—W. Blake Foster, '60, Secretary, 60 East Boulevard, Rochester.

San Diego, January 21—Richard I. Singer, '53, 3003 Fourth Ave., San Diego.

Detroit, January 26, with Professor John Wulff and Donald F. Carpenter, '22—J. Edward Schwartz, '52, Secretary, 1912 Yosemite, Birmingham, Mich.

Cleveland, January 27, with Professor John Wulff and Donald F. Carpenter, '22—Walter A. Rajki, '51, Secretary, 21269 Hillsdale Ave., Fairview Park.

The Council's Year Begins

THE ALUMNI COUNCIL's first meeting this year at the M.I.T. Faculty Club on October 26 drew 179 members and guests to hear Professor William P. Allis, '23, discuss world affairs, and Herbert G. Weiss, '40, describe a new aid to world and galactic communication.

You Don't Have Time, Of Course . . .

. . . to read everything in Technology Review. "I almost resent the high quality of The Review, since it is so good that I am forced to read it, but reading time is precious," an electrical engineer, Class of '39, recently commented.

But you may have a friend with plenty of time for such reading. If so, you can send him The Review for one year as a Christmas present.

Simply send his name and address to the editors, Room 1-281, M.I.T., Cambridge, Mass. 02139, with a check for $4—and a note asking that he be notified that The Review will be a gift from you.

Professor Allis returned to Cambridge this fall after serving in Paris as Assistant Secretary General for Scientific Affairs for NATO. Despite difficulties of diplomacy that he described, he discerned little danger of a military attack in Europe if the West remains united.

Dr. Weiss emphasized the great precision of the new Haystack microwave research facility operated by Lincoln Laboratory (see Technology Review, November, 1964, p. 31) and the technological advances by means of which such precision was attained.

President Donald F. Carpenter, '22, of the Alumni Association presided and the head table guests included Chairman James R. Killian, Jr., '26, of the M.I.T. Corporation.

Institute Yesteryears

As recalled by the late H. E. Lobdell, '17

25 Years Ago

"THE INSTITUTE begins its 75th academic year at a moment when war in Europe, as a threat to the advancement of enlightenment, presents an unmistakable challenge to educational institutions throughout the world," declared the editor of The Review; and President *Karl T. Compton,* in his Annual Report, "frankly reckoned with the challenge" as follows:

"We meet at a critical time such as has occurred previously about once in each generation, but which we hoped in 1919 would never occur again. War and rumors of war again disturb our equilibrium and may threaten our peace on this continent. . . .

"Above all else our forefathers struggled to secure freedom and opportunity and to safeguard these as inalienable human rights for their posterity—for us and our children's children. To do so, they established our democratic form of government and adopted our Constitution. To make democratic government workable, they established a great system of education. We of M.I.T. are a part of this system. While our immediate objectives are to discover and to teach the truth, especially in the realm of the physical world and man's adjustment to it, our ultimate objectives are those of our nation: to promote freedom and opportunity among men. For truth, in the form of exact knowledge, brings freedom and opportunity to those who gain it.

"It therefore seems to me that our first duty, in this time of turmoil and danger, is to carry on our normal educational program as effectively as possible and with a minimum of confusion. Whatever course future events may take, the world will need young men versed in science and skilled in the arts of its application to promote human welfare."

► On December 28, the Institute mourned the passing of Professor *Henry Greenleaf Pearson,* Head of the Department of English and History for 19 years. Upon graduation from Harvard in 1893, he joined the Institute staff, being promoted to assistant professor in 1898, to associate professor in 1907, to professor in 1915, and to head of the department in 1919. His biography of President "Richard Cockburn Maclaurin" was published in 1937.

50 Years Ago

STONE AND WEBSTER'S vouchers covering the first 15 months' expenditures for the construction of the "New Technology," up to December 1, 1914, totaled $1,312,798.52. As the editor of The Review remarked, once the foundation for a building was finally laid, "it began to rise at the rate of nearly a foot a day, and the passer-by was impressed by the almost miraculous growth which was apparent from day to day."

► On December 15, there took place the formal opening of the temporary building housing the Institute's new aerodynamic laboratory—wherein were accommodated the first students to receive instruction on the Cambridge site. The laboratory, the first of its kind in the United States, was headed by *Jerome C. Hunsaker, '12,* "Instructor in Aviation," and *Donald W. Douglas, '14,* "Assistant in Aeronautical Engineering."

► In December, 1914, the Institute mourned the passing of the first Alumnus to give his life in World War I—*Paul G. Vignal, '14,* Captain, Chasseurs Alpins, French Army, who was killed in action in the Ypres sector.

75 Years Ago

DURING DECEMBER, 1889, there was completed on Trinity Place, Boston, a six-story brick building which came to be known as "Engineering A." Its two lower floors contained laboratories for the Department of Mechanical Engineering; the next two, class and drawing rooms; and the top two, the Department of Civil Engineering.

► "The present situation of the Institute is one which awakens in the minds of its friends mingled feelings of rejoicing and apprehension," wrote President *Francis Amasa Walker* in his Annual Report to the Corporation in December, 1889.

"On the one hand we have passed through another year of the highest prosperity, as regards the current work of the school. . . . On the other hand, it is a source of deep regret, and of grave apprehension, that the school, at the end of 24 years, is still, after all that has most generously been contributed towards its immediate needs by its many friends, virtually unendowed. . . . Of the $203,500 which was absorbed during the past year by the current expenses of the school, not less than $158,000, or 78 per cent, was provided by the fees of the students; while but little more than $25,000 was derived from the income of invested funds. Such a dependence of a college of the first rank upon tuition fees is altogether unknown among the educational institutions of the United States . . ."

► "The fifteenth Annual Meeting and Dinner of the Alumni Association was held at Young's Hotel, on Friday, December 27, 1889. In the absence of the President, Vice-president, and Secretary, the meeting was called to order by *C. Frank Allen, '72,* of the Executive Committee, and Acting Secretary. On motion, *James P. Tolman, '68,* was elected chairman for the evening. . . ."

Professor Allen's report showed the Association's balance on hand to be $76.07, and that the amount in the Alumni Fund was $1,347.23.

100 Years Ago

ON DECEMBER 1, 1864, at a meeting of the Institute's Society of Arts, held in the Mercantile Building at 16 Summer Street, Boston, announcement was made that:

"The Institute proposes to receive pupils for instruction the present winter. Its friends will have an opportunity of securing for it a munificent donation of $50,000 by subscribing a similar amount before the 1st of January next. . . ."

Class News

'95

Out of the 400 members in our freshman class, we have left only 10 members, living in New England, Florida and California. I hope to hear from you 10 soon.—**Andrew D. Fuller,** Secretary, 120 Tremont Street, Boston, Mass.

'96

The Secretary participated in the Fifth Officers' Alumni Conference at M.I.T. to review suggested changes in the constitution and bylaws. At the conference, we were told that we are expected to be knowledgeable and interested officers. Being the class representative and regularly attending meetings marks one as "interested." On the other hand, "knowledgeable" leaves a reasonable doubt that would be relieved if each classmate sent a memo of his doings once in awhile. . . . Last October an old-timer watched the Mayflower II perform some unusual maneuvers under sail, directed by television cameras and producers in a launch and on a tub and said, "Who says one can't teach an old dog new tricks"? After the television crew resigned command, the ship sailed under a real skipper to Provincetown for a brief stay and sailed back to Plymouth. There she stayed until Thanksgiving.—**James M. Driscoll,** Secretary, 129 Walnut Street, Brookline, Mass.

'97

With the elimination of summer's heat and a termination of vacations for numerous M.I.T. "brass", there should be news of interest concerning the antique classes. At this writing, early October, there is practically none. I am glad to say not even an obituary. Some half-dozen young (?) grads, classes of 1897 to 1912 meet for a monthly lunch at the New York Chemists' Club and discuss M.I.T. problems. Your scribe is generally able to be present, but the next in youth is Clarence Joyce, '03. . . . My class file was recently augmented by a new list of original class members and a list of the present 21 survivors. Most of them seem to be too feeble to write. None have commented on the idea of getting Class of '97 records, now in the possession of Mrs. **Jack Ilsley,** into general M.I.T. Alumni records at Cambridge. There being no objection, the move will be made. . . . **Will Binley** gets about and writes occasionally, so does **Ed Hawkins. Jay Tone,** according to a Des Moines paper gets to work daily. Good for Jay and the spice business. . . . This desk, not being over 30 miles from the New York World's Fair, should have lost its occupant to the Fair for a couple of days. However, this is not so as the writer has been to five World's Fairs, and the new features of this one are not too alluring.—**George R. Wadleigh,** Acting Secretary, 70 Flower Avenue, Hastings-on-Hudson, N. Y.

'98

As this is the issue just prior to Christmas, we take the opportunity now to wish all our classmates and their families a very Merry Christmas. . . . **Bob Lacy,** after summering at Squirrel Island, Maine, is back at 201 Tunbridge Road, Baltimore, Md. Our president, **Ed Chapin,** with his sister, Marion, vacationed in New Hampshire during July and August. They reported that they encountered considerable cold, cloudy and rainy weather with only about five or six really pleasant days. Incidentally, they ran across **Al Davis** who, with his sister-in-law, was touring these New Hampshire mountains. **Fred Jones** traveled by train to Minneapolis where he spent a week during part of September with relatives in that area.

From the Alumni Association, we received a list, as of August 15, 1964, naming the members of our class both dead and living. The list shows 448 original members. Of these there are 40 now living and 408 deceased. Of the 40 living, the addresses of 6 have been unknown for many years, leaving 34 on the active list. Our president, **Ed Chapin,** born October 22, 1877, is the youngest of the 34. Five '98 alumni celebrated their 90th birthdays during this year.

We learned, under date of October 1, 1964, from Marion Chapin that her brother Ed was hospitalized for minor surgery for about two weeks in September, but has returned to his summer home at 2 Gregory Street, Marblehead, for a short period of recuperation. We expect to report in our next Review that he is as vigorous as ever. . . . We sometimes wonder what courses are taken now at M.I.T. and how they compare with those of '98 days. We recall only 13, the 13th being a general course. Now there are 22 courses, designated by Roman numerals and letters; some of them subdivided as XXI-A, XX1-B. Also there is Course CER (Ceramics), FG (Fuel and Gas Engines) and GP (Group Psychology). A long list to choose from in a new age of specialization.

Interesting to members of our class are the following awards for essays for 1964, announced by the trustees of the Babson Gravity Research Foundation at New Boston, N.H.: (1) $1,000, "Negative Mass as a Gravitational Source of Energy in the Quasi-Stellar Radio Sources" by Professor Banesh Hoffmann, Queens College, Flushing, N.Y.; (2) $300, "Quantum Theory and Gravity" by Professor Ryoyo Utiyama, Osaka University, Osaka, Japan; (3) $200, "The Nature of Sources of a Gravitational Field" by Professor Ezra T. Newman, University of Pittsburgh, Pittsburgh, Pa.; (4) $150, "Detection of Non-Newtonian Gravitational Effects with Quantum Fluids" by Robert L. Forward, Hughes Research Laboratories, Malibu, Calif.; (5) $100, "A New Gravity Meter" by Dr. Henry P. Kalmus, U.S. Army Materiel Command, Washington, D.C.—**Frederic A. Jones,** Secretary, 286 Chestnut Hill Avenue, Brighton, Mass. 02135; **Edward S. Chapin,** President, 271 Dartmouth Street, Boston, Mass. 02116.

Happy Birthday

During December three Alumni celebrate their 90th birthday anniversaries; 7 and 11 Alumni reach respectively, their 85th and 80th milestones, as listed below with dates of birth.

December 1874—ALBERT F. RUCKGABER '96, on the 4th; AMOS E. GILLESPIE '97, on the 8th. HENRY W. CHAMBERS '01, on the 31th.

December 1879—ALBERT A. CASANI '01, on the 4th; DENNIS F. HALEY '01, on the 5th; ROBERT M. DERBY '01, on the 11th; JOSEPH T. LAWTON, JR. '06, on the 19th; HOWARD BAETJER '02, on the 20th; FREDERICK W. BARROWS '07, on the 24th; GEORGE E. T. EAGAR '02, on the 25th.

December 1884—EDWARD H. DEAN '06, on the 4th; EVERETT E. TURKINGTON '07, on the 4th; BERNARD H. MORASH '12, on the 5th; GEORGE S. COLEMAN '08 on the 7th; FREDERICK W. LYLE '08, on the 7th; PHILIP G. LAUMAN '12, on the 8th; LOUIS BARNETT '09, on the 11th; ALLEN T. WEEKS '08, on the 13th; HENRY S. MEARS '06, on the 14th; BRADFORD W. DRAKE '07, on the 19th; LOUIS S. GORDON '08, on the 28th; CLARENCE J. BROWN '09, on the 29th.

'00

Harry L. Grant wrote as follows: "On July 8, 1964, I passed my 85th birthday. My wife, Margaret is now 80. Her college was Bryn Mawr—1906. We have been married 53 years. We have lived in Chicago, New York, Cleveland and finally 30 years in Washington, D.C. In 1953 I retired, briefly, from a long and satisfactory business career with the New York Shipbuilding Company. Then I was associated with Western Electric Company (Graybar), and finally my own business in Washington as a manufacturers' representative. Since 1953 our permanent home has been Barber Farm, Jericho, Vt. For several winters we traveled in Europe, going as far afield as Istanbul. We enjoyed England especially but found every country thrilling with its art galleries, theatres and ballet. Other highlights were the mountains in Switzerland and the Rhine and Danube Rivers in Germany and Austria. On our last trip in 1959, we took our daughter-in-law and granddaughter with us, also my sister, Mrs. Frank Sheridan. We now stay close to our hill top farm, summer and winter, surrounded in summer by our family and friends, in the five cottages on the hill top. **Stanley Fitch** has often visited us

here. We find our cottage warm and comfortable even in sub-zero weather. The snow is beautiful, pure white and clean with deep blue shadows. . . . In 1961 we lost our only son, who was a history professor at Middlebury College. His wife lives in Middlebury, his daughter is a junior at Middlebury College and his son is at St. Paul's School in Concord, N.H." Harry is one of the youngest living members of the class, there being only three who were younger and these by less than three months. The Class roster still totals 36, there having been no losses reported during the last 12 months.—**Elbert G. Allen,** Secretary, 11 Richfield Road, West Newton 65, Mass.

'01

I have absolutely nothing to write. The only news that I get is when some classmate passes away, and I do not like to write "obits." I give you all fair warning that if no news is forthcoming there will be no notes.—**Theodore H. Taft,** Secretary, Box 124, Jaffrey, N.H.

'03

To our classmates who are remote in time and distance from the expansion of M.I.T. buildings and courses of instruction, it is really striking, yes overwhelming, to compare them with our own limited college domain on Clarendon Street overlooking Copley Square, Boston. Yet, we return each year to enjoy the commencement exercises at Cambridge and mingle with the vast throng of Alumni, comparable to a huge family, with its own joyous memories, all filled with devotion to the alma mater. The recent news from M.I.T. is that it will enhance its public services through the Educational Council, made up of 700 members from 140 areas in 41 states. Its members are informed in matters concerning science and general education and will be instrumental in distributing information on admissions, student aid and other programs at M.I.T. for the use of students.

The new skyline of M.I.T. is outstanding to Alumni, because the new buildings tower over the city; their top lights might form a beacon for the surrounding countryside. . . . The Grover M. Hermann Building, built of reinforced concrete at the east end of the campus, has underground parking facilities. The enormous and beautiful chateau of Mrs. Stanley McCormick, '04, for the increasing population of women students is beautifully situated along the Charles River esplanade. Technology Square, adjacent to campus, is an 800,000-square-foot office and research center situated on 14 acres of land and owned jointly by M.I.T. and Cabot, Cabot and Forbes Company. The four buildings are oriented toward a central plaza which will be completely landscaped. The lobby level of the individual buildings will contain shops, restaurants and a bank. The first building is now open and well occupied. The second building is also nine stores high and of the same design. They are an expression of simple elegance in cast stone, contrasted with grey glass walls. The remaining two buildings in the Tech Square complex are envisioned as a 20-story tower and a two-story display center of executive office buildings. This location is convenient to all public transportation, not only to Boston but to all its suburbs. To complete our review is the tall, slender building recently dedicated to Cecil **H. and Ida** Green, who gave bountifully for earth sciences research and teaching in geology, geophysics, geochemistry, meteorology and oceanography. This building was chosen to provide a focal point for Eastman Court on East Campus. The roof holds two radar platforms used in upper atmospheric research, a weather tower, a balloon shed for launching instruments used in upper atmospheric research and a large transparent plastic dome that shelters radar equipment. . . . Our birthday greetings go to **William A. Howell,** VI, for his 80th on August 12; **Paul R. Parker,** XIII, on September 13 for his 85th and **George B. Bradshaw,** X, on September 30 for his 85th milestone.—**John J. A. Nolan,** Secretary, 13 Linden Avenue, Somerville, Mass.; **Augustus H. Eustis,** Treasurer, 13 State Street, Boston, Mass.

'05

Gilbert Tower, XIII, **Bob McLean,** II, and I attended the Alumni Class Officers' Conference at Cambridge on September 11 and 12. We had quarters in Baker House and it was very interesting thinking of the days 60 years ago while basking in today's dormitories. All the talks were very interesting and instructive, and I hope that I may have absorbed something to pass along to reward the Alumni Association for my entertainment. Gib seemed in good health, talks as profusely and as interestingly as ever, and apparently enjoys being his town's (Cohasset, Mass.) self-appointed Planning Board, although he says at town meetings his fellow townsmen do not see eye-to-eye. Bob isn't as loquacious, but is in dead earnest about finding out how to increase his class's percentage of givers to the Alumni Fund. Let's help him out—something from everyone, so we may hit 100 per cent. It's now 40 per cent.

Much of my recent correspondence has to do with attendance or non-attendance at our 60th Reunion. **Art Manson** (Houston, Texas) says he is in fine health and will be there, if possible. Texas is a great place to be, but not in June, Art, unless, of course, you live in air conditioned home, auto, or street. . . . **Roy Allen** says that he and Grace are in good health, that in June they drove to the coast and enjoyed the change from the hottest spot in the U.S.A. (Phoenix, Ariz.). They expect now to drive to the other coast, arriving in time for our 60th. In response to my welcoming Roy into the Octogenarian Club, he states that he cannot see that he feels much older than 30 years ago "except." Same here, and glad there are not too many excepts. Roy is a 100 per cent Goldwater man and says —well, I guess I won't repeat it. So am I, Roy, and having lived two months in Texas I could agree with everything I have expurgated. **Ted Steel,** VI, says, "Few of the men at our 60th Reunion will even remember my name or would recognize me were I to walk in the door at the Belmont. About four years ago an '04 man said, over the phone: 'Ted, are you still as serious as you used to be?' That is part of the trouble I admit. That and a deepening interest in the Quakers and their American Friends Service Committee. The Quaker emphasis on the view that religion is a way of life, indeed the whole of life, becomes challenging and also humbling. One of the things which has especially endeared the Quakers to me is their belief that building a better world on this earth is one of man's primary responsibilities to God and that men and women can do something about it, guided by what they call the Inner Light." I agree with you, Ted. As I write I am looking out my window towards a Quaker (or Friend's) burying ground where my great-grandfather and grandmother were buried. I attended a Friends Meeting in the northern part of our town one Sunday this summer. It was certainly "challenging and humbling."

Charlie Mayer, IV, writes: "Do you remember the Harvard-M.I.T. riot on Trinity Square and Rogers steps? Would like to see a Boston paper account of that day —I remember I had on a red turtleneck sweater and I guess grey trousers, when the Boston police chased us off the steps as we were singing and then they charged us on horseback on Trinity Square. Don't remember the year or date. Didn't know we were lawbreakers at that time and don't think so now. Not much news—my health is real good. Have yearly checkups but can't see that the doctors do any good except take a wad from my pocketbook and give me pain in my backside. Sorry to learn of **Norman Lombard**'s sudden death. He was some guy, one that I really admired when at the Institute. There are none of the seven who took Course IV, Option 2 '05 left except myself." Yes I remember, Charlie. The date was Thursday, November 3, 1904. I have at least a score of clippings from the Boston Journal pasted in a great big 1905 Scrap Book. I also have a large piece of cloth torn from a transparency used in that parade saying "Tech stands for the Strenuous Life." Lest someone correct me that might have been a memorial of our stunt at Nantasket Beach in 1909. . . . Mrs. **Harold F. Tompson,** VIII, (**Mildred Wheeler**) of Seekonk, Mass., our only dues-paying coed, had the misfortune to fracture two vertebrae, incapacitating her for several months. The Tompsons celebrated their 50th wedding anniversary on September 26. Mildred has been a loyal '05 "man" ever since graduation and has attended at least two reunions. May she recover fully.

From his son, I learned of the death of **Hiram Leroy Walker,** II, on August 23, 1964. Roy would have been 84 in No-

vember. He and I graduated from the same high school (Peabody, Mass.), took the same course at M.I.T. and worked together in Philadelphia for a short time in 1906. **Walter Eichler,** II, informs me that he and Roy left Boston for Philadelphia in July, 1905, and entered the employ of the Lanston Monotype Machine Company, where they worked together for several years; Walter left after a few years to go to Ludlow Manufacturing Co. Roy continued with Lanston for 47 years, retiring in 1951 to his summer home on the Schuykill River, Norristown, Pa. Early in 1906 I joined Roy and Eich at Lanston on an apprenticeship. **Maurice Landers** also joined Lanston, took a night law course and became a patent attorney. —**Fred W. Goldthwait,** Secretary, Box 32, Center Sandwich, N. H.; **Gilbert S. Tower,** Assistant Secretary, 35 North Main Street, Cohasset, Mass.

'06

In the November notes I reported my attendance, with **Stew Coley,** at the 5th Alumni Officers' Conference in September. During the sessions in Kresge we had an opportunity to see the number and great variety of M.I.T. publications, on display on long tables in the lobby. Cards were available on which to file requests for any copies desired. I do not remember seeing any catalog listing them but there may be one and if you are interested I would suggest that you write to Carroll Bowen, Director of the M.I.T. Press. One report was there in quantity for distribution—the 1964 Alumni Fund Report, which has since been mailed. If you received one you have probably noted that we didn't do so well last year, dropping below 40 per cent participation, for the first time. So our Class Agent **Sherm Chase** and I hope that all former contributors and many new ones, will dig in and send their "mickle" to make the '06 "muckle" a new high record for 1964-1965. . . . The only recent mail was a card from **Bob** and Anne **Rose,** homeward bound on the 'White Heron' after their long sojourn at the Worlds Fair marina. Awhile ago I had a phone chat with Sherm. He and Bertha do not make any more long trips he said but he goes to the office now and then (Metcalf and Eddy) and attends meetings of the several professional societies of which he is a longtime member. At a meeting of the Consulting Engineers in New York City, in September he had a chat with **George Burpee,** who told him that one of their office staff (Coverdale & Colpitts) who had been on an overseas mission vowed that he never wanted to visit Egypt or India again—too dirty! He liked Japan, clean and pleasant.

Along in October I talked with Mary **Kidder, Jim**'s older sister, who said that his condition hasn't changed much. He sleeps much of the time and would enjoy your postcards. Just before Thanksgiving I will have a yellow mum sent to Jim and Mary from the class. Fred Lehmann has informed us that Jim's name has been removed from their mailing list at the request of his son Norton.

One of our oldest classmates died during the summer or early fall, **Sarah Emeline Potter.** She had taken courses in architecture and biology and for a number of years was a teacher of biology in the Girls High School in Boston. She retired around 1930 and since then has lived in Charlestown, N.H. The report of her passing came from the Women's Association of that town but gave no date, which I will try to obtain. . . . **Harold William Beers,** I, S.B. died August 2 in Atlanta where he had lived since 1907. He was born May 11, 1884, in Silver Mine, Conn., but his family evidently moved to Taunton, Mass., as he prepared at that high school. He was a member of the Civil Engineering Society; his thesis was on "Tests to Determine the Strength of Mortar Joints." After a year as assistant in civil and sanitary engineering, and except for war service, George was in the contracting and construction business with his office in Atlanta. Starting as a draftsman, he was with the Southern Ferro Concrete Company for many years, becoming vice-president, president and general manager. He then formed his Beers Construction Company, finally becoming the honorary chairman of the board. He had entered service in World War I as a major in October, 1918, at Camp McClellan, Ala. In 1908 he married Nancy Carroll.

Charles James Rich, II, S.B., died August 7 at his summer home in Scituate. He was born May 4, 1883, in Norwood, Mass., and had always lived and been in business there. He prepared at that high school and came to Tech from Dartmouth, being listed as '04 and '05 and graduating with our class. He soon joined E. Fleming and Company as a bookbinder, later was with Berwick & Smith (Norwood Press), becoming general manager and assistant treasurer and retiring about 10 years ago. He founded Boston Offset in 1940 and has been a director of the Cohasset Music Circus for several years. He was a former member of the Norwood School Committee, and a trustee of the Plimpton Fund of the Congregational Church. He leaves a son, C. Lothrop, who is on the Norwood Board of Selectmen. Our ten year class record book was printed by Norwood Press and the compiler, **Jack Norton,** ended the foreword thus: "The class is indebted to the Norwood Press for courtesies in connection with printing and binding; to our classmate Charles J. Rich of the Press for giving generously of his time and knowledge; and to the compiler's wife for invaluable help in assembling the material and reading the proof." From a letter to the '05 secretary Fred Goldthwait, by his assistant secretary Gil Tower, I quote: "For years Charlie has spent his summers at North Scituate beach. In recent summers I have seen him at the Cohasset Music Circus where he has been interested in photographing the plays and the players. His hobby of photography has been a great help to him."

Andrew Fisher, X, S.B., '05 died September 3 at his home in Roxbury (Way Cottage) where he had lived for 50 years or more. Although Andy graduated with us, he had been with '05 previously and so had friends in both classes. Being an outgoing sort he had kept in touch with many of those friends through the years and my last note from him was in June. Typical of Andy and ending with a chuckle! I have omitted his career, expecting that Fred will include it in his '05 notes. . . . Looking out at the colorful autumn foliage it is hard to realize that when you read these notes Christmas will be in the offing. So with our best wishes to you all for a happy merry holiday and a New Year full of interest and satisfaction, from your secretary and Marion.—**Edward B. Rowe,** Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass. 02181.

Deceased

FRANK E. GUPTILL, '96
BENJAMIN MILLER, '01, September 5
ALTON P. TRUFANT, '01, September 8
FRANK S. BRADLEY, '03, September 15
HIRAM L. WALKER, '05, August 23
HAROLD W. BEERS, '06, August 2*
SARAH E. POTTER, '06*
CHARLES J. RICH, '06, August 7*
BRADFORD W. DRAKE, '07, September 16, 1963
LOUIS JACOBY, '09, March 3
DOUGLAS W. SMEATON, '09, 1963
WALTER J. ROUNTREE, '09, November 5, 1963*
F. LAWRENCE MOWRY, '12, June 27*
CHARLES H. WILKINS, '14, July
EDUARDO D. BELDEN, '17, 1963*
RICHARD D. FAY, '17*
EMIL A. GRAMSTORFF, '17, September 1*
LLOYD B. SALT, '17, August 28*
ARTHUR E. BURKE, '18, September
MARGARET P. OLFENE, '19*
HENRY R. COUCH, '20, July 26*
HOWARD FIELD, '20, February 24*
GEORGE C. MANNING, '20, September 19*
RAYMOND S. PERRY, '20, July 16*
WALTER A. SHERBROOKE, '20, August 12*
JOSEPH L. GILLSON, '21, August 4*
GEORGE M. HERRINGSHAW, '21, January 6
ERNEST M. BEST, '22, September 4
NORMAN P. RANDLETT, '22, August 10
FOREST G. HARMON, '23, September 26
HENRY L. NEWHOUSE, '29, August 19*
WHITNEY WEINRICH, '30, June 27, 1963
GEORGE A. CATANZANO, '31, September 8
JAMES C. LIVENGOOD, '41, 1963
T. PATTERSON SPENSER, '48, April 3
HENRY SUCHER, '52, August 3
ROBERT D. BROWN, '56, September 16
STEPHEN F. GRISOFF, '60, September 14
STEPHEN WOO, '62, September 29

*Further Information in Class News

'07

Neither president **Don Robbins** nor your secretary attended the Officers' Conference at M.I.T. on September 11 and 12. I was on vacation at the Cape, and Don was in the hospital, having undergone an operation for stomach ulcers. Don called me after he returned from the hospital and reported the operation had been most successful and that he was well on the way to recovery. . . . The 80th

birthday letters that I sent out in the name of the class bore some fruit:

Parker Dodge, II, wrote from Eggemoggin Reach, in Maine, which is at the mouth of Centre Harbour, to say how much he appreciated being remembered and asked me to extend his best wishes to all the class. Parker and his wife are really enjoying life, although he says that, "getting old is not a reversible reaction," and that it annoys him. Parker married Charlotte Phelps, who was graduated from Smith and later, from M.I.T. in architecture. She designed the house they live in when in Maine. The Dodges have seven children, all married and living, and 17 grandchildren, all doing nicely. One recently was graduated from the University of Maine and is married; another has finished her junior year at Smith. She has just completed summer courses in Greek and Hebrew at Harvard. Although an octogenarian, Parker says he can "still sail on the best sailing water in the East," which is off the Maine coast. . . . **Earl H. Reed, IV,** writes on his letterhead as an architect at 343 South Dearborn Street, Chicago. He says he is actively engaged in the work of preservation of historic buildings, both for the Committee and National Park Service. At present, he is in the middle of the Indiana Dunes fight, near which he lives, and on Senator Douglas' side. As a member of the Park Service's Advisory Board, and as a newly appointed collaborator, he will continue to support the U.S. Government. Sugarbush Farm, where the Reeds live, was the setting of quite a family reunion this past summer. His daughter Joanne and son-in-law Bates and three children came from Saudi Arabia, daughters Dorothy, from Virginia, and Linda, who was graduated from Earlham and is a ceramic student at Alfren, Toledo. Mrs. Marion Reed was the hostess, helped out by the family pup "Thursday." Thanks, Earl, for your good wishes, and congratulations.

Jim Barker, I, wrote me about the **C. D. Howe** Memorial Foundation which has been set up by a substantial group of prominent Canadians to provide C. D. Howe Memorial Fellowships to perpetuate his memory. I quote from the brochure which gives its purpose: "The purposes of the Foundation in offering the awards are to honour and promote imaginative and skilled enquiry in recognized fields of learning and high quality of leadership among young Canadians at advanced stages of their education. The first awards, tenable initially in 1964-1965, are for the assistance and encouragement of those who have completed their formal education and whose unusual capacities of mind and character give promise of leadership and decisive achievement in their fields of learning and endeavor." George B. Ferguson, Editor-in-chief of the "Montreal Star," has prepared a tribute to Clarence and your secretary is to receive a copy of it to put in the class archives. . . . Jim and his wife have just returned from Tokyo, where they were guests at the annual meeting of the World Bank. In connection with this meeting, they flew around the world, stopping in Yugoslavia, India, Thailand, Hong Kong, Manila, and Taipei, a section of the world the Barkers had not previously visited. The bank holds every third annual meeting in some foreign capital, such as Tokyo, Vienna, Istanbul, New Delhi, Paris, Mexico City, etc. The other meetings are held in Washington. Probably the reason why Jim was invited as a guest is that he was chief of their mission to Turkey in 1949 and 1950. This group was charged with the responsibility of laying out a program of economic development for Turkey.

During the two weeks I was on my vacation on Cape Cod, I visited with the following class members: **George A. Griffin,** I, and his wife Giffy reside in the Gifford family homestead at Woods Hole. George's son Bob has returned to Woods Hole to take over his father's business as an engineer and surveyor. This will relieve George of some of his problems and give him more time for relaxation. **Milton MacGregor,** VIII, has a very comfortable year round home on Lower Road in Brewster. We called at his home and found that Mrs. MacGregor had recently returned from the hospital. She had a bone failure in her knee but was getting around with the use of a brace. The MacGregors attended the Baptist Church in Needham, as we did, over 40 years ago, and we enjoyed discussing old friends and what they were doing. Mac is one of the very busy class members. He runs his farm, a small cranberry bog, is very active in Cape bowling. He also has many duties in the Brewster Baptist Church and helps out when needed in the neighboring churches. For vacations, he tramps over the White Mountains. . . . The most interesting call that I made was on **John Mather, VI,** at Cotuit. John retired from the U.S. Army as a brigadier general. At one period of his army service, he was in command of the U.S. Arsenal at Watertown. John apologized for not answering any of his '07 mail by saying, "I never write to anyone." While he is not in the best of health, and finds it difficult to get around, he has an exceedingly keen mind and asked me many questions about his former classmates. It was an additional pleasure to meet his wife and tell her about some of our '07 activities. I wish some of our Course VI men would write to John.

The report of the 1964 Alumni Fund is out. Fifty-two '07 members contributed $20,046, or an average contribution of $385. There must have been some very generous giving by a few members to produce this high average. No other single class from 1879 through 1963 had such a high average contribution. We owe much to our Class Representative, **Don Robbins,** for the work he has put into our class giving."—**Philip B. Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville, Mass.

'08

Thanks are due **Harold Osborne** for the following bit of news. On Sunday, September 13, at the 11 A.M. services of the Presbyterian Church of Upper Montclair, chancel flower stands were dedicated. These stands were given by Mrs. **Frank McGuigan** in loving memory of her husband who died in January, 1963. . . . Harold tells us that he completed his terms as mayor of Montclair but "did not choose to run" for another term. May we wish you all a very Merry Christmas and a happy New Year.—**H. Leston Carter,** Secretary, 14 Roslyn Road, Waban 68, Mass.; **Joseph W. Wattles, 3d,** Treasurer, 26 Bullard Road, Weston 93, Mass.

'09

In the November notes we stated that space limitations prevented our including further class notes and obituaries and that these would appear in the December Review. . . . **Lockwood Towne, I,** who lives in Brookfield, Conn., wrote the following to **Art Shaw:** "I have just advised the committee that I shall be unable to attend the Class Reunion at Swampscott. I greatly regret that my present situation makes this necessary and want to give you a little further explanation. I have suffered from minor arthritis for several years and when we returned from Europe last spring after clambering around a lot of ruins in Egypt, Greece, and the Middle East, not only had I done my arthritis no good, I also had a case of sciatica which required hospitalization and a lot of therapy to get me on my feet again. This, including a very stiff neck, makes it difficult to drive the car so that I had to admit to my family's protestations that the 300- or 400-mile drive, including some night driving, might get me into trouble. So I meekly surrendered. I greatly enjoyed the 1959 reunion and was looking forward to a similar meeting this year, but alas, it is not to be. With best personal greetings to any of the class who may remember me, including yourself."

We also received a note from **G. Irving Emerson,** XI, from Boca Raton, Fla., where he is retired, stating that he and his wife had planned to attend the reunion but a virus which she had developed prevented their coming. He sent greetings to his classmates and wished the reunion every success. . . . During the summer **Tom** and Alice **Desmond** sent us a postcard from Iceland where they had stopped as part of a long trip abroad. Tom explains the trip in a recent letter as follows: "A principal purpose of our trip abroad was to obtain material for a book my wife Alice is writing concerning the tragic life of the daughter of Marie Antoinette. It will be a fictionalized biography for girls of high school age. In this connection we visited Trieste, near the Yugoslavia-Italy border, Basle in Switzerland, and finally spent a week in Paris. We also traveled for other reasons for some time in Western Germany and were delighted to find in Munich bookstores a new German translation of a book for young children which Alice wrote a number of years ago. The book had for its background the coffee district of Brazil, and its old title in English was 'Jorge's Journey.' In the German translation the

title was changed to 'Dunkle Spur Auf Roter Erde.' We were surprised as well as pleased that a German publisher had brought out a translation of such an old book, but then coffee is popular with many Germans."

On September 11 and 12 the Institute held the Fifth Alumni Officers' Conference. As may be recalled from former class notes, these conferences have been held quite regularly during the past few years. The attendance consists of alumni officers, class officers, and certain members of the faculty. Our class was represented by our president, **Molly, Francis Loud,** and your secretary. The general purpose of the conference was to acquaint us with the alumni organization, its clubs and their activities, the Technology Review, solicitation for the Alumni Fund by the Alumni office, by the clubs and class agents, the student environment such as dormitories and athletics, teaching and research programs, and the physical plant. On Saturday morning we met in the lecture hall of the new, tall Earth Sciences Building, where we listened to three most interesting and instructive lectures by members of the faculty on the developments of the earth sciences, the exploration of space, and the use of computers in plotting data. During the conference we all were guests of the Institute. The conference closed with a luncheon at the Faculty Club and a most interesting address by Donald F. Carpenter, '22, President of the Alumni Association. The luncheon was followed by a bus tour of the Institute campus during which the several new buildings were pointed out to us. During the conference we were addressed by both President Stratton and James Killian, Chairman of the Corporation, on activities and future planning of the Institute. An important aspect of the conference was the opportunity to become better acquainted with alumni from all the classes.

Edward B. Rowe, '06, sent us a clipping from the Boston Herald of August 10, telling of the death of **John Edward Otterson,** XIII-A, of Ridgefield, Conn., at the age of 83. He was a graduate of the U. S. Naval Academy in 1904 and had a most distinguished career. He was at one time president of the Winchester Repeating Arms Company, held an important position with the Bell Telephone Laboratories, was vice-president of both the New York Edison Company and the Western Electric Company, president of Paramount Pictures, and president of Electrical Research Products, a subsidiary of American Telephone. During World War II he headed the New Jersey Shipbuilding Corporation and East Coast Shipyards, Inc. Funeral services were held in New Haven. He is survived by a son, John E., Jr. of Chicago, and a sister. . . . The Alumni Office sent us a notice of the death on November 5, 1963, of **Walter J. Rountree,** II. He was born in Georgia and prepared at the Donald Fraser Preparatory School, and attended the U. S. Naval Academy before entering the Institute. He was a teacher and director of the Technology Department of Newberry College in South Carolina. He then taught at Georgia Tech. Later he was employed by the Georgia Power Company, and finally he joined the Pacific Mutual Life Insurance Company, Atlanta. His last address was Decatur, Ga.—**Chester L. Dawes,** Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass.; Assistant Secretaries: **George E. Wallis,** Wenham, Mass.; **Francis M. Loud,** 351 Commercial Street, Weymouth 88, Mass.

'11

Recently I received from the Alumni Office a list of 192 living and 225 deceased members of our class. A total of 457 persons were enrolled for at least one term as students in all courses of instruction. The 1930 Alumni Register, in addition to listing 389 living and 29 deceased, reported "no information" in respect to 83 members. This gives a probable peak listing of 511. There were only 297 classmates in our Senior Portfolio. Probably the interesting item in all these statistics is that of the 457 classmates of record, 44 per cent were still living 53 years after 1911. . . . A final report from our Asiatic traveler, **Jim Duffy**: "Safely home again. Jet travel is wonderful! Breakfast in Chicago, lunch in London, dinner in Vienna, baggage in Buenos Aires!" . . . The annual report of the 1964 Alumni Fund has just been issued. 1911 leads all the classes by a wide margin in "per cent participation." A bit of satisfaction for our Class Agent **O. W. Stewart.—John A. Herlihy,** Treasurer and Acting Secretary, 588 Riverside Avenue, Medford, Mass. 02155.

'12

Word has just been received of the death of **E. Carhart Van Syckel** who passed away at his home at 6 Parkway Road, Brookline, Mass., early in the year. Van had been retired for the last few years. . . . Mrs. **F. Lawrence Mowry** has written us of the death of her husband on June 27 this year. Mowry had been with Swift and Company as a construction engineer for 42 years. He retired in 1954. . . . **Ralph Symonds** is at the Lafayette Convalescent Home, Lafayette Street, Marblehead, suffering from Parkinson's disease. He is able to sit up and is a constant reader of detective stories. Mrs. Symonds has not been well and was unable to care for him at home. Ralph would be delighted to hear from any of his old friends. . . . **Edmund L. Homan,** who retired from General Electric several years ago, is living at his home at 14 State Street, Marblehead, Mass. He is only half a block from Marblehead Harbor and enjoys watching the boats. . . . **John Raymond** is active with Metcalf and Eddy, Statler Building, Boston, Mass. He goes to the office every day. Mrs. Raymond is not too well but is able to get out and has enjoyed the good weather this summer. . . . A note from **Arch Eicher,** 1718 Wood Road, Cleveland Heights 21, tells that he is at the office every day and feeling well although like the rest of us he tires quite easily. His wife Agnes is well and they are enjoying their grandson, age 5, and granddaughter, 9 months, who live nearby.

Betty and **Charles Rowley** spent the month of June at their Harwichport home on the Cape and are both well. . . . Priscilla and **Jay Pratt** were in a serious automobile accident traveling East this summer. Fortunately, they were not seriously injured although their car was demolished. . . . A report from the Alumni Fund office states that the Class of '12, with 192 living members, could do better for the fund. 74 members of the class contributed last year, which is only 39 per cent. The amount contributed was $4,214 or an average of $57 per person. **Albion Davis,** our class agent, whose address is 217 Commonwealth Avenue, Boston, Mass., would welcome a contribution from you. Even though the amount is small, it will help on participation. The classes just before and just after us are doing much better than we are.—**Frederick J. Shepard, Jr.,** Secretary, 31 Chestnut Street, Boston 9, Mass.; **John Noyes,** Assistant Secretary, 3326 Shorecrest Drive, Dallas 36, Texas.

'14

Another of our classmates is giving up an active professional life. We are indebted to the Charlottesville, Va., daily newspaper for the following item: "**Oliver C. Hall,** a veteran of 52 years in the telephone industry retired yesterday from the United States Instrument Corporation. Hall started his career in the telephone industry in 1912, working in the summer as a lineman for the Southern New England Telephone Company. After graduating from M.I.T. he joined the American Telephone and Telegraph Company, Long Lines Department in New Haven. Subsequent moves with the company eventually took him to the Bell Telephone Laboratories in Summit, N.J. Here he was associated with the development of improvements of the step-by-step telephone apparatus, which is the basic system used by telephone operating companies for their switching offices in local exchanges. This experience prompted him to join U.S.I. in 1955 after retiring from Bell Labs. At U.S.I., Hall was placed in charge of the adaptation of the Siemens and Halske apparatus for use in the United States. The first of these motor-switch telephone systems was successfully placed in operation in 1958 in Las Vegas, Nev. Hall's wife, who died in July, 1962, was the former May Gardner of Radburn, N.J. She was active in many Charlottesville community activities. The Halls had four children: Oliver Ellsworth Hall, an electronics engineer with the Navy Department Bureau of Aeronautics; Elizabeth Gardner Hall, on the staff of the New School of Music Study in Princeton, N.J.; Margaret Hall Chandler, a junior research chemist for the Standard Oil Company of Ohio; and May Gabrielle Hall, a graduate of the MacIntire School of Commerce of the University of Virginia, who now lives in

Charlottesville. Hall plans to stay in Charlottesville and spend more time on his hobbies, the chief of which is photography."

Time has taken its usual toll, and we have several deaths to report. **Charles George Maier,** Course XIV, died on April 19, 1964, at his home in Sebastopol, Calif. After graduation he spent some time with the Carborundum Company at Niagara Falls, N.Y. Later he went with the Phelps Dodge Corporation in New York City. Still later in 1923 he was connected with the U.S. Bureau of Mines in Salt Lake City and also Berkeley, Calif. For a while, beginning in 1943, he was connected with the Battelle Institute in Columbus, Ohio. He moved to California in 1947. . . . **Clifford Johnson Walton,** Course VI, died in Harrisburg, Pa., on June 9, 1964. He spent practically all of his professional life in the engineering department of the Bell Telephone Company of Pennsylvania; first in Philadelphia and later in Harrisburg where he was district plant engineer. He married Miriam E. Jones on August 14, 1916. There were three children: Thomas J., John H. and Clifford, Jr. He also left a magnificent heritage of character through his relations with his fellow man and his dedication to community and church affairs. It was a great privilege to know Cliff. . . . News has been received of the recent death of **Sidney Vanuxem Smith, Jr.,** Course III. He was a member of our class for three terms; our records do not give any other details of his life. His last address was Star Route, Marysville, Calif. . . . We also have a note indicating the probable death of **Fucheng Seetoo,** Course XIII, of Shanghai, China. Shortly after his graduation he was assistant naval constructor at the Kingnan dock in Shanghai. We have no further information.

During the last hours of the reunion, **Charlie Fiske,** who had been staying near Boston to be near Marie, who had been hospitalized for some time, received news of her sudden death. This was a great shock to all and in addition to expressing its profound sympathy to Charlie, the class voted a memorial gift to the Bath, Maine, hospital where she had spent much of her time in recent months. . . . Scarcely a week after the big party, **Leicester Hamilton** was rushed to the hospital with a ruptured appendix. For some days it was nip and tuck, but a rugged constitution and a 1914 background brought him around as good as new. . . . Question: What member of the class, a reunion participant, shortly after returning home, almost got to Mexico to escape the heat but was deterred by a broken denture, walked through a plate glass door and was hospitalized for repairs, then settled down and painted and sold several pictures. The first one sending in the correct answer will receive a five dollar rebate on his advance toward the 55th Reunion.—**H. A. Affel,** Secretary, R.F.D. #2, Oakland, Maine; **Ray P. Dinsmore,** President, 9 Overwood Road, Akron 13, Ohio; **Charles H. Chatfield,** Assistant Secretary and Alumni Fund Class Agent, 177 Steele Road, West Hartford, Conn.

'15

Only seven months to our 50th Reunion—you will be there, of course! In our lifetime we can have only one of these reunions—so how about it? By now you have received our first notice, "1915ers Hold On," designed by **Al Sampson** and contributed by David Hamburg. Many thanks to them both. A devoted band of fellows have agreed to be course representatives. So you will be hearing from them, personally, in addition to the regular mailings sent by the Reunion Committee. Mona Lacy and her ladies' committee have set up an unusually attractive program for the class ladies in Boston on Saturday afternoon, June 12. . . . The splendid results for 1915 in the 1963-1964 Alumni Fund were due to the tireless efforts of **Max,** our Class Agent and **Clive Lacy,** our Special Gifts Chairman. Nice going, fellows—congratulations. At the Alumni Officers' meeting at M.I.T. in early September Max, Al Sampson and I represented our class. We visited later with Dix Proctor, a hard worker in 1917. . . . In September I had a visit with Virginia and **Hank Marion** who were staying in nearby Lexington. It was amazing to see Hank walking and getting around without any assistance—a vast improvement over even his condition when he surprised us all at the June class cocktail party. Nice going, Hank, and keep it up. We are all happy to see Hank back in circulation again and well on his way to a complete recovery from his serious surgery. . . . In New Haven in September, I had a chance to visit with Jan and Fred Lutz, who is a hard worker for 1927.

For indomitable spirit read **Mary Plummer Rice**'s interesting letter from Paris. Many thanks, Mary. It will be wonderful to see you again at our 50th, and we are all looking forward to the pleasure of having you with us. "My enthusiasm for the 50th Reunion took a set-back this summer when **Ralph Curtis'** daughter wrote me that he had died in July in West Springfield. We had corresponded for years, ever since M.I.T. made him an honorary secretary, which pleased him beyond description. The three months' freighter trip down the west coast of South America, calling at 21 ports (including Buenos Aires where I have a large family), took me through the Straits of Magellan. Do you remember how exciting Magellan seemed in our youth? From Buenos Aires, Montevideo, and Rio, an Italian ship landed me at Naples. A month's train trip took me through the Scandinavian countries as near the North Pole as possible. The blizzards there were similar to those at Cape Horn, but the midnight sun was beautiful. Now I am here in Paris until next May, at my 'home' where I have been staying since 1928. The summer course at the Sorbonne was disappointingly difficult. Did I think I was as alert and quick at memorizing and taking dictation from these French philosophers as the 17-20-year-old youngsters? It was such a blow to my 70-year-old pride. But I did pass the exams. After a month in London and Dublin I will return to Paris, determined to conquer the imperfect subjunctive of those hundreds of French irregular verbs. Generations of New England stubbornness! But Paris is so beautiful, in spite of the fact that this Center for American University Women has been given to Columbia University for a Center of Architecture and will be filled after September 1 with Columbia professors, wives and students. Reid Hall has been permitted to retain two rooms and I am one of the very lucky two to stay here this winter. Have you had any interesting cruises lately?"

Herb Anderson's repertoire carries him on, even with strangers: "About a year ago **Albert A. Walter** gave me some encouragement that after all these years he might show. We had a wonderful cruise in the Middle East in early 1962 and had a dinner table the entire trip with Al's very talented older sister who is a famous portrait painter on the West Coast. Her husband, a very well-known attorney as well as author, matched my stories quite well but I couldn't touch his ability to talk Arabic." . . . We all hope **Bridge Casselman** will be in good enough health to join us at the reunion: "According to the doctors I am recovering from my second heart attack. According to me I am having a tough time recovering from all the medicines they have been giving me." Brave old Bridge. . . . **Jerry Coldwell** grounded himself long enough to enjoy part of the summer at Center Lovell, Maine, where he said the hotel served altogether too good food.

Another Fifteener, our **Alan S. Dana** divides his retirement between South Portland, Maine, and Hamden, Conn.: "It has been a hectic year; I sold my home in Ansonia (after 37 years) and condensed junk from nine rooms, attic and basement into a four-room apartment in Hamden. A major operation, and we are far from settled. Nice to hear from you and know you must have enjoyed your last trip. Good!" . . . When do Helen and **Otto Hilbert** ever stay put: "We have had a busy year. On January 1, we left Corning by train for Los Angeles, then by ship to Honolulu for a week. Then on to Manila, Bangkok, Kaumalapau, Singapore, three weeks in New Zealand and then back to Honolulu for another week and by ship back to Los Angeles. We then flew to Buenos Aires on business, Santiago and Sao Paulo. After a week in Florida we arrived home May 1. We then went to the Rotary International Convention in Toronto." Otto is, of course, our age—how does he do it? We hope he lights some place long enough to come to our 50th. . . . **Ray Stringfield:** "We were at Sunset Beach, which is just below Long Beach about three miles, and tried to reach **Bill Mellema** who is now living at Surfside which is the next beach, but the operator said his phone was temporarily disconnected, so guess he and Pearl are on vacation. We sneaked away at the end of July for a few days in the beautiful redwoods some 200 miles north of San Francisco. Ran out of Perry Masons so had to come home. I keep so busy here that it's nice to get away and just loaf. We

expect to get back for the 50th next year, and want to run up into Maine and Vermont which neither of us have seen. Best regards to you and Fran." Now here's class spirit for you. . . . With his generous check to **Ben Neal, Bur Swain** wrote, humorously: "In order to be counted I am enclosing my check for the 50th Fund. I was too dumb to keep 'it' when I had it. My wish is that you are very successful in your work on the fund and the total is not yet in sight. Good health and peace of mind to you and yours." Go, thou, and do likewise!

On September 25, at the M.I.T. Faculty Club, we had another big, gay and enjoyable Class Dinner—further evidence of why "1915 is the Class Supreme." Thirty classmates, sons and guests relished a pleasant cocktail hour and delicious Bill Morrison dinner. The **Pirate,** lean and lithe as of old, led off with a "We are happy" cheer. Present were: Larry Bailey, Wayne Bradley, Whit Brown, Jack Dalton, Alan Dana, Ben Hurwitz, Larry Landers, Clive Lacy, Azel Mack, Doug McMurtrie and his son Dave McMurtrie and his grandson, Douglas G. McMurtrie, Archie Morrison, Frank Murphy, Harry Murphy, Charlie Norton, Wally Pike, The Pirate and his son Gerry, Al Sampson, Jac Sindler, Bill Smith, Ed Sullivan, Easty Weaver, Pop Wood, Max, Fred Waters, '27, Herb Eisenberg, '52, Gene Eisenberg, '43, Jim Hoey, '43. **Doug McMurtrie** captured all honors—our first classmate to bring his son and grandson to a class dinner. It certainly was impressive to have these three personable McMurtries with us. Come again! And it was good to see Wayne Bradley, Whit Brown, Alan Dana, Ben Hurwitz, Bill Smith, Pop Wood and our four young guests who are always welcome. . . . **Bill Smith,** a real admiral, has retired to live in Boston. We welcome him to the Boston crowd and will look for him at every class activity. Because of a long visit in Chicago, **Sam Berke** missed the dinner. **Speed Swift** wasn't quite up to that long trip from New London, N.H. Our regular attending Lowell twins, **Reggie Foster** and **Chet Runels** have both been seriously ill in the hospital, so we sent them signed "get well" cards with our best wishes for speedy and complete recoveries. . . . **Louis Young**'s son, Paul, is desperately sick and we send Polly and Louis our sincere feelings. . . . **Ben Neal** tried hard to get up from Lockport but just couldn't make it. We sorely missed these staunch classmates.

Larry Landers was recently made a fellow of Brandeis University, an outstanding honor richly deserved for his generous interest and support of that fine school. Larry has again set up our annual New York City Class dinner for Friday, January 22, 1965, at the Chemists' Club there. The big crowd planning to go over from Boston is expecting to see an even bigger crowd from metropolitan New York. That work-horse, **Bur Swain,** will co-operate with Larry to make this another big success for 1915. Plan to be there to discuss final reunion plans. . . . Long distance competition at the Boston dinner created a tight race with Archie and Fred, Marblehead; Whit, Concord; Max, Framingham; Larry Bailey, Duxbury; Pop, Peterboro, N.H.; Charlie Norton, who must have walked on the waters from Martha's Vineyard. The "winnahs" were Wayne Bradley, Moosup, Conn.; Allan Dana, Portland, Maine; and Doug McMurtrie and his family from Gorham, N.H. A fine group of good fellows. . . . After the Faculty Club meeting a number of the fellows came over to our apartment for a pleasant and late visit with Fran and a little cognac. **Charlie Norton** stayed over with us as a house guest—very nice all around. At the dinner Max thanked the class for their splendid contributions to last year's Alumni Fund; George described our visit to Coonamessett to set up the reunion plans; Al touched on the annual class cocktail party and **Jack Dalton** sent us home with a tribute to the camaraderie and friendly spirit in good old '15. Come to our 50th Reunion in June and "Help Azel."—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.

'16

Greetings from our ski-lovin' president, **Ralph Fletcher,** and start getting ready for the 49th Reunion, says he! We had several interesting items to report on **Bob** and Pearl **Wilson** in the November column, but had to defer them when we received the most distressing news of Bob's death in Geneva on September 1. Though retired from the AEC early this year, he was in Geneva to attend the Conference on Peaceful Uses of Atomic Energy as an adviser to the United States delegation, for this was a subject in which he was the U.S. expert. We had three cards from the Wilsons in July and August, one from Bob asking for the address of **Laurin Zilliacus** who, Bob recalled, had been a professor in Helsinki—a place they expected to visit. But the 1961 Alumni Register gave no address. In a separate note Pearl wrote: "Yes, Zilliacus was graduated with Bob, **Bill Leach,** and **Earle Pitman.** I took a picture of the four of them with their diplomas." And here is another item. Early in June, at Wooster College, representing the 50-year Class (1914), Bob offered some penetrating helpful "remarks" at the Wooster Annual Banquet in Wooster, Ohio. Again, on June 24 in Chicago he received from the American Society for Testing and Materials their gold (yes, solid!) medal award, designated as the 1964 ASTM Award to Executives. The award, in part, reads: "The Recipient: Robert Erastus Wilson. Distinguished scientist, industrialist, and educator; chairman of the board, retired, of Standard Oil Company (Indiana), with ninety patents to his credit; maker of many notable contributions to industry, education, and religion during the forty-four years of a distinguished career." The award is given to "an executive who, through his outstanding interest and support, has furthered the accomplishments of ASTM." We have a printed replica of the medal to display at the 49th Reunion. Bob and Pearl were at the 48th in June where he gave an illuminating talk on the peaceful uses of atomic energy. He will be sorely missed at coming reunions. The deepest sympathy of the class has been sent to Pearl.

A clipping from the June 29 issue of the Boston Globe indicates that **Arthur Wells** continues as town treasurer and tax collector of Wellesley. He is quoted as saying: "There is no relief in sight as long as town and school building costs increase. We need new property to tax. The present zoning by-laws prevent business expansion and high rise apartment construction. Without a change in them, our tax rate will continue to rise." . . . Here's something we didn't know before—something that was made clear by a clipping received from **Don Webster** noting that the **Theron Curtis'** 50th wedding anniversary was to take place on September 16. Just a little figuring (1964 minus 50—that's the system) shows that sure enough they were married when Theron was still in Tech. We knew in those days, of course, about the **Emory Kemps,** for they had the class baby while Emory was a freshman. The Curtises have two sons, seven grandchildren, and one great-grandchild, all of them nearby except one son in the Army in Germany. . . . **Vertrees** and Sylvia **Young** had three weeks in the West in August. As Vert says: "The directors of the Crown Zellerbach Corporation were invited to bring their wives to a luncheon in honor of the widow of James D. Zellerbach prior to the July board meeting. We had halfway planned a trip with some friends from Yuma but gave it up until this invitation was forthcoming, and then they picked us up the day after the meeting and we drove through the redwoods of northern California, across southern Oregon and Idaho, the length of Utah and across northern Arizona. This was a combination rock hunt and sightseeing trip and included the redwoods, Crater Lake, Glass Mountains, Salt Lake City, Bryce and Zion Canyons, and the Grand Canyon from both the north and south rim, and the meteor crater west of Winslow, Ariz. It was a delightful and productive trip from a minerals standpoint."

Early in September, **Jap Carr** told of getting ready in Buck Hill Falls, Pa., for more than 100 tennis enthusiasts who were to arrive for their annual BHF tournament. He was running the affair once more. He and Hildegarde left for Texas on October 1 to visit their one and one-half year-old grandson, then went on to Los Angeles where they sailed for Hawaii. Jap checked up on **Irv McDaniel**'s and **John Ingle**'s addresses, and relative to John wrote: "He married a Honolulu girl to whom I had a letter of introduction when the Army sent me to Hawaii in early 1919." . . . **Dick Knowland**'s permanent address is now Largo, Fla., but he is back in Goshen for the summers. He writes: "Respecting the non-earthshaking matters of my personal affairs, after spending most of my working years at consulting work of one or another sort, I am retired except for one client of long standing. Incidentally it is not easy these days to keep up with things that move so rapidly that even EDP is already old hat. We spend our days in

Florida at housekeeping and garden club work for Kay; gardening and fishing for me, coupled with a lot of reading. In the Berkshires, about the same except that the old man spends a lot more time trying to keep the place up since we rather rattle about in it. Nowadays, however, there are no 'critters' in the place except for an angora cat and ourselves."

Francis Stern tells of a month on the West Coast, with their children in Los Angeles, and then north to Lassen National Park, "the newest of our National Parks, which is still volcanically active." From there they went on to Guerneville "where our children have some acreage and where they have spent summers for many years at a resort known as Murphy's Guest Ranch. It is a family type deal, with about 120 people, two-thirds of whom are children who never stop screaming, or hollering or yelling, and everybody sits down at the table at once, eats what is put in front of them which incidentally is awfully good. We were there 10 days and enjoyed it." . . . We have a wonderful picture of **Van Bush** to post on the reunion bulletin board, appearing in Technion Yearbook 1963, with the caption: "The author is one of the truly great men of science of our time. He pioneered in the field of computer technology and directed the Office of Scientific Research and Development during World War II." . . . As of August 1, **Hovey Freeman** retired officially but remains "as Chairman of the Board with very little to do." Says he spends most of his time at his summer home in his shop working on boats or repairing furniture, toys, and such. He says: "This summer we have had a very active time because we have had 17 of our 21 grandchildren for part of the summer and two of our great-grandchildren on occasional visits. The grandchildren had a wonderful time with their three horses, motor scooter, golf cart, boats and motorboats. They have now all returned to school this last week and Mrs. Freeman and I are again alone but are slowly catching our breath. No plans as yet for this winter."

Now we have an excerpt from **Irv McDaniel**'s letter written after they got back to California from the reunion in June: "We have always loved the Canadian Rockies (especially the Valley of the Ten Peaks) and we returned there with the purpose of comparing them with the Alps. Katherine and I voted Alps. When I arrived home there was a letter from Jim Flaherty, '17, telling me to keep on writing letters for The Review. Which reminds me—on Alumni Day I wore my name plate and card and class. At noon five alumni (Classes '03 and '13) asked me if I was the one who wrote the travel letters. At the KT party, three alumni asked me the same question; so did one other at dinner. Two said they liked the Egyptian one the best (and that was one of the first you printed). So you see your column is read and remembered. I was very surprised!" . . . **Ed Weissbach** has now retired again, this time from his job as rector of Christ Church in Somerville, Mass., and is attacking neglected hobbies. He and Elizabeth went to Europe in June and he writes: "Elizabeth had never seen my German cousins so we visited them in Oldenburg, Coblenz, and Stuttgart. As traffic is heavy there in the summer, this time we bought (over here) Eurailpasses —good for first class passage on any train in 13 countries, on the railroad busses, and on the Rhine steamers. . . . Traveling by train we found it wise to check our heavy bags—had no trouble in Germany or Switzerland, but Italy was another story. There they tied up the suitcases with heavy cord and then sealed them with lead seals—this was because the bags had center locks and they were afraid that en route they might be pried open . . . Of the towns, Freiburg (British Sector) was as interesting as any. There we saw a group of students at a restaurant table produce a glass boot the size of a rubber knee-boot. This was filled with beer and passed around to the girls and boys, and the first one who let air into the toe of the boot, as he drank, had to pay for all." Ed says they did learn one thing—"Don't go tourist class on a Mediterranean ship!"

Charlie Lawrance regularly keeps in touch, and we have exchanged bits of technical information in the field of statistics and quality control, in which we have an interest. The Lawrances have had visits from dentist-son Bill and family and from electronics-physicist-son Richard and family which have kept the summer busy and interesting. And speaking of statistics and probability, a fine letter from **George Petit,** who continues as a statistical consultant in construction and baseball (White Sox) circles, gave this prediction for the American League back on September 4: "You may see a double or even a triple tie at the season's end." When we look at the final results, we can say we want to be sure George is on our side, for who could be closer than that? . . . From **Don Webster,** besides the clipping about Theron Curtis that noted TC "is retired as vice-president of the Industrial National Bank of Providence," we have these items: "**Herb** and Vi **Mendelson** were in Osterville on their boat, and we had a lovely evening and dinner together at the Flying Bridge in Falmouth. Eleanor and I had a quickie call on us by **Cy** and Gypsy **Guething** on August 26. It was great to see them looking so well . . . Haven't been to Cotuit to see either **Santa Claussen** or **Jack Burbank**—am ashamed of myself . . . Now Labor Day has gone and the Cape is gradually being given back to us natives and Indians!" . . . **Bill Drummey,** though retired, seems to be as busy as ever: "Such things as consulting work, or construction quarrels, or court disputes, and extraneous civics as being put on Mayor Collins' Commission to determine whether the Back Bay will be an historic area or will allow high rise apartments, keep me going." He "admits" to the same 'three grandchildren, and says it is a matter of time "before I'll be adding 'great' (only 1) to the 'grandfather'."

Berthoud Boulton's report of last April suggests a strong constitution and good health. His major project has been the detailed design and construction of an unusual house on a beautiful small lake near St. Louis, where he lives with his sister. He says: "About 85 per cent of the work I did myself, including digging a total of 225 feet of foundation and waterline trenches in Missouri clay. The exterior was completed last fall and I am starting the interior next week. The distinctive feature is the use of 11 large trusses employing 2 x 12 inch fir timbers in pairs, the longest being 23 feet. This summer I am looking forward at 5:00 o'clock to enjoying highballs on the patio looking down the lake." His other principal activity has been with their new Junior College where he serves on the staff curricula committee and has been preparing course outlines for strength of materials and structural analysis courses which he hopes to teach. . . . **Charlie Glann** in May writes from Oswego where he had just finished preparing three frames (18 sheets) of stamps on the "Evolution of Precancels" for the Oswego Stamp Club Exhibit. In reference to delayed writing Charlie quotes: "Better late than never but better never late—a fine motto but one not easy to follow." He says he is "marking time" for his wife has two years plus to go before her retirement from the "Brain Factory," the high school of the Oswego school system.

One thing we learned about **Maury Holland** at the reunion was this—he is the author of six books: "Industrial Transition of Japan" (1927); "Industrial Explorers" (1928), story of the nation's leaders in research in industry: Jewett—Bell Labs, Kettering—General Motors, Whitney—General Electric, Mees—Kodak, Sperry—Sperry Gyroscope; "Architect's of Aviation" (1951-); "Management's Stake in Research" (1958); and "Helpful Hints to Shell Hunters" (1959). Maury still recalls Jim Evans at the reunion: "waiting at the window of Bachelor Quarters, like an anxious House Mother awaiting the arrival of her children." Maury has had an unusual career participating in unusual scientific developments with men in high places, and has on tap, true story after absorbing true story.

We have heard that the **Howard Hands** left Florida early in July for their usual summer in New England but traveled by way of Chicago where son Richard and family including four grandchildren are located. Howard speaks of old haunts like Wellesley, Lowell, York Beach, Ogunquit, and a ski lodge at the foot of the Cranmore Mountain (the Tramway) at North Conway. And on one of their trips to New England, the **Harold Millses** reported: "After going by Old Sturbridge Village about 100 times in the last 20 years, we finally visited it on this trip. You need a whole day to see all of the interesting houses, etc. in the village." As we all know, **Bill Barrett** is chairman of the Planning and Development Committee of Sturbridge Village.

We don't like to be fussing about other people's work, but many will understand what we are talking about if they were ever assigned in printed history to a wrong technical organization. What we are referring to is an article quoted in the June 1964 column of the Class of 1917, an article by our old friend Dick Fay, '17, on "Underwater-Sound Reminis-

cences—Mostly Binaural," published in the December 1963 issue of Sound magazine. The following is quoted in the 1917 column as coming from Dick's pen: "The Navy gave its blessing to the proposal and there was formed a group comprising personnel from the General Electric Company, and the Westinghouse Electric Company as well as the Submarine Signal Company." Well, here is the point of our comment. You see, your Secretary was a member of one of these three groups (as was Harold Mills), and had such binaural sensitivity as to have his ears classified as the "reference standard for binaural accuracy" in some 1917-1918 Navy circles, but it was as an engineer with the Western Electric Company, not the Westinghouse Electric Company (!!) that we took part in this work. Before writing to Dick about the error, we got a copy of the magazine from a library, and found that it correctly referenced the "Western Electric Company." (After the above was written, we were very sorry indeed to hear from 1917's Assistant Secretary, Dix Proctor, that Dick Fay died on September 9.)

Jim Evans reports telephone visiting with **Bud Curtis** in Hudson, Mass.—retired, two children, seven grandchildren. Jim has word too from **Harold Fuller** in Bryn Mawr, Pa., who says he gave in to a payroll job in 1958, after two periods of illness cut into his "daily fee consulting" program. He is in the tanning industry and has taken his vacations regularly in August on the Maine coast. . . . Jim took a large number of color pictures at the reunion in June, and we will have an unusual collection to post on the bulletin board at our 49th next June. He continues to send out the notices for the class monthly luncheons held in the Chemists' Club, 52 East 41 Street in New York, two flights up, jointly with the Class of '17. These are held at 12:00 noon on the Thursday following the first Monday of each month, e.g., December 10 and January 7. The October luncheon was attended by Steve Brophy, Jim Evans, Herb Mendelson, Peb Stone, and your secretary; the Class of 1917 was very absent for they were holding an interim class reunion in the midst of the fall foliage in Manchester, Vt.

We found **Herb Mendelson** more-than-perturbed about something when we met for the luncheon. And he surely did have something to worry about. And he is doing something about it, for he is chairman of the Executive Committee of the Emergency Committee to Stop the 64th Street Subway in New York City. It relates to an active proposal to blast a tunnel under the East River, and thence directly under East 64th Street to the West Side. This would affect a fine residential neighborhood and Herb cites reasons why the committee feels this would be an expensive mistake. . . . This concludes the column for the moment. We appreciate the good responses to requests for news or philosophy and continue to urge that you write a little but write often, to help keep the column interesting. If you know of any '16er who is ill, one who should receive letters or cards, let Ralph, or Jim Evans, or your secretary know. And now, to one and all, the best wishes of your class officers for a Mer-r-r-ry Christmas and a healthful New Year.—**Harold F. Dodge,** Secretary, 96 Briarcliff Road, Mountain Lakes, N.J.; **Ralph A. Fletcher,** President, Box 71, West Chelmsford, Mass.; **Joseph W. Barker,** Vice-president, 45 Beechmont Drive, New Rochelle, N.Y.; **Hovey T. Freeman,** Treasurer, 45 Hazard Avenue, Providence, R.I.; **T. D'Arcy Brophy,** 50-year Reunion Chairman, 470 Park Avenue, New York 22, N.Y.

'17

As these notes are being written for the December issue of the Technology Review, the World Series is tied at two all and the 47th Reunion has passed into history. . . . At the Alumni Officers' Conference in September at Cambridge there were eight in attendance, Just Basch, Bill Dennen, Stan Dunning, John Holton, Al Lunn, Win McNeill, Dix Proctor, and Ray Stevens. . . . In The New York Times of September 22, the following notice appeared: "Abraham & Straus, Retailing Division of Federated Department Stores, Inc., announced yesterday the appointment of **Kenneth C. Richmond** as executive vice-president. Mr. Richmond formerly served as vice-president and treasurer." In the New York World Telegram of the same date there was a similar announcement with Ken's picture. . . . A note from **Stan Dunning** advises that **Eduardo D. Belden** of Monterey, Mexico, died about a year ago, but is still on the M.I.T. mailing list. On one of the returned postal cards for the 47th Reunion is this message: "Mr. **Lloyd B. Salt** passed away August 28, 1964". Lloyd's entry in the 30th Anniversary Report reads as follows: "Have been 4-F since the First World War, but am still alive, have been with B. F. Sturtevant Company, now Westinghouse Electric Corporation, since 1917. During World War II worked for American Red Cross and U. S. Army Air Corps as volunteer. Also worked on heating systems for planes and designed gasoline fierd boiler for Glenn L. Martin Mars." We shall miss Lloyd.

The illustrious secretary of our good neighbor class of '16, Harold Dodge, advises of an error in our June notes relative to Professor **Richard D. Fay,** in that his connection was with Western Electric Company, rather than Westinghouse. Now we have a clipping from the "Boston Traveler" of September 10 as follows, "Southboro—Richard D. Fay of Parkerville Road, Professor Emeritus of the Department of Electrical Engineering at M.I.T., died last night at his home. He was 72. He was a former navigator aboard the famous racing sloop "Yankee," and was a direct decendant of the New England navigator, Samuel Bowditch of Salem. Professor Fay sailed in Gerard Lambert's Class 'J' boat in the mid-thirties when she was skippered by Charles Francis Adams. He was graduated from Harvard in 1913 and from M.I.T. in 1923. He returned to teach at M.I.T. in 1928 after several years in acoustical research. He served in the Navy in World War I as engineer in charge of the Nahant Experimental Station for the Submarine Signal Corps, and in World War II in secret acoustical work for the Bureau of Ships. He was appointed assistant professor in 1930, and associate professor in 1934. He retired four years ago. Professor Fay was the author of several books and many articles on acoustics and several articles in 'J' Class racing. He was a member and a fellow of the American Institute of Electrical Engineers, the Acoustical Society of America, and the Nahant Dory Club. He leaves his wife Hester; two daughters, Mrs. Robeson Bailey of Kennett Square, Pa., and Mrs. I. Garfield, Jr., of Southboro; a son, Richard, of Nahant; two brothers, Arthur of Nahant, and Dr. John H. of Dover; and two sisters, Mrs. Bernard Montagu, and Mrs. Andrew Gilmour of England."

The Boston Traveler of September 2 tells us of the passing of **E. A. Gramstorff:** "A Memorial Service for the former dean of graduate studies in engineering at Northeastern University was held at the Hancock Congregational Church in Lexington and burial in Westview Cemetery. Gramstorff, who lived on Hilltop Road, Lexington, died at the Fairlawn Nursing Home in Lexington. He was 72. He has served on Northeastern's faculty for 42 years, retiring in 1962. He was appointed an instructor in civil engineering in 1921, assistant professor in 1923, associate professor in 1926 and full professor and chairman of the department in 1939. He held that post for 15 years until he was made dean. He was born in Everett, and educated in Everett Public Schools and the Chauncy Hall School in Boston. He received his bachelor of science in architectural engineering and a master of science in civil engineering from M.I.T. He was a lieutenant in the U.S. Naval Reserve in World War I, a former member of the Boston Planning Board, and of the Massachusetts Scientific Advisory Committee on Selective Service. At Northeastern, he was a leading member of the faculty, serving as chairman of many academic committees, and as president of the Faculty Club. He was past president of the Boston Society of Civil Engineers, the Massachusetts section of the American Society of Civil Engineers, and American Society of American Education, and the American Society for Testing Materials. He was a life member of the Palestine Lodge A.F. & A.M. He leaves his wife, Pauline; three daughters, Mrs. Catherine Munday of Topsfield, Mrs. Jane Gove of Northfield, and Mrs. Ann Anderson of Andover; two sisters, Mrs. L. K. Thomas of South Dennis, and Mr. L. B. Pittman of Venice, Fla.; and nine grandchildren."

Our 47th Reunion was treated to the most delightful weather at Manchester, Vt., and the Green Mountains were splendid in the fall foliage. **A. R. Williams** and wife arrived on Tuesday while the rest began arriving on Wednesday from luncheon on. On Thursday the **Ed**

Tuttles and **Don Kendall** arrived for lunch. Then came Don Severance and wife, our honorary member, which made a total of 28. Thursday morning, while six played golf, the rest drove over to Bromley and Stratton mountains—the ski lifts were not operating, so no ascents. In the evening after dinner we assembled in a private room and managed to enjoy ourselves until nigh onto midnight. Al Lunn reviewed events, **Lucius Hill,** our honorable treasurer of long standing, gave a minute report.

Then Dix Proctor, Acting Chairman, gave a statistical report. As a second notice, 360 double postal cards were sent to the entire class, 127 cards were returned and 64 bore messages, of which the following were read. **Henry Strout:** "My best regards to everybody, wish very much we could be with you all in Manchester, but I am tied up and cannot make it." . . . **Phil Cristal:** "I am still working! No more vacation available, we will welcome any and all enroute. Since most weekends are spent in our cottage in Melvin Village, N.Y., on Lake Winnepesaukee, we will be available there on Saturday, otherwise Merchants National Bank, or 174 West River Road, Manchester, N.H. It's a fine idea, but we cannot make it." . . . **Vincent Panettiere:** "Regards and best wishes for a very enjoyable reunion. I shall be with you in spirit, from Sarasota, Fla., and send you warm greetings; will try for the next reunion." . . . **Tom Meloy,** Falls Church, Va.: "Greetings and salutations—Olé to all the fine stalwarts of the great Class of 1917—this is the NSSA Day of annual dinner of which I am chairman." . . . **Ed Payne,** Hyattsville, Md.: "Still working for D.O.D. at the expense of some interference with my life—best wishes and sincere regrets—may all the lights be green and New England misanthropic climate held in check until after the reunion." . . . **Rudy Beaver:** "Dear Classmates—it breaks my heart to miss the shindig in Vermont, but wisdom says Helen and I will be safer and cozier at our New Hampshire camp, which is beautiful this time of the year. We are not sick—just cautious. Seventeeners drop in if you are hereabouts. We are on Lovell Lake, Sanbornville, N.H., are listed under Sanbornville in the Rochester telephone book—522-3673. Ask Heinie, Ken Bell, Ken Lane, and Ray Stevens. Have a good time." Answering Helen's inquiry, Vi is O.K. . . . **Dick Catlett,** Richmond, Va.: "I hope everybody holds out until the 50th—I'll be there then."

Jim Ferrall, Chicago, Ill.: "reply delayed in hopes important business could be completed in time to make it. Grace and I wistfully send cordial greetings and best wishes for a happy and colorful 47th Reunion and hope to see you at the 48th." . . . **Walter F. Pond,** Greybull, Wyo.: "Shall be in the far, far West—will be glad to contribute financially, greetings to the very few who remember me in the late, lamented Course III." . . . **Larry Gardner:** "Physical conditions make it impossible for me to attend any two- or three-day get-together—no more golf, dancing, etc. Perhaps I could drop in for some one session if I know the schedule. Send me notice of any assessment, and keep me posted. Regards to all." (Sorry schedule was not formulated until after arrival, however; these two cards have been turned over to Loosh and no doubt you will hear that the assessment was $3.00 per man.) . . . **Dud Bell,** Bristol, Pa.: (Letter received dated September 24 from somewhere in Germany.) "The Reunion in Vermont has been on my mind for weeks. Helen and I have been over here for a most unusual experience. We chartered a yacht in Athens, and proceeded to sail the Aegean Sea. The yacht was equipped with two parallel keels, 500 pounds each, which prevented upsetting. We had good sail spread, but only a light motor. Under normal conditions, we could have sailed any ocean, but the storms and heavy winds suddenly hit us. Islands with safe ports are few in the Aegean, and miles apart. Visibility became bad and we decided to turn back to a little gulf port on an island we had passed. It was a rough voyage, but we made it. In the port we saw a large Greek coast guard boat which had observed us through glasses. We were greeted with whistles and sirens—by God we deserved it. The next day we stayed there, although twice during the night our two anchors did not hold. I awoke with the tossing of the boat, we had drifted out to sea. Each time we got back by the motor. The storm continued so we stayed close to shore, tied together with another boat, similar to our own, sailed by a Greek and his fiancee. His sails had been ripped and most stays broken. We were in better shape, so we left in the morning and battled waves and sea to another port—so far so good. Storms never let up, two days later we decided to return to Athens, some 40 miles away. After a few miles the jib ripped, then the mainsail. The motor jammed. I finally got sails lashed down and the motor going and limped back to port, the yacht was useless. We left it there and returned by steamer. Licked, yes—but next year I extend the invitation to any '17er to be my guest. Now I have never missed a '17 Reunion in my life and hope to get back in time." (Sorry you did not make it Dud, but glad we will see you at the 48th.)

Six cards were returned for wrong address or postage; nine were unsigned but several of those had messages such as: "I hope the class gets going on the 50th Reunion Gift. I've done all I could in years gone by, but I will be glad to help Ray Stevens as a member of his committee." (Ray will be pleased to hear from you). "I was married on August 14, 1964, at Pacific Grove, Calif., to Mrs. D. F. Dell, of London, England." (Congratulations! and what is her name now?) . . . Those attending the reunion were: A. R. (Bill) Williams and wife; Lucius Hill, Treasurer, and wife; Stan Dunning and wife; Ken Lane and wife; Heinie Gartner and wife; Alan Sullivan and wife; Ray Maeder and wife; Ray Stevens, chairman 50-Year Gift Fund, and wife; P. F. Maher, Golf Supervisor and wife; Bill Dennen and wife; Dix Proctor, Chairman and wife; Al Lunn, President, (Sue was preparing for a concert and could not make it); Don Severance, honorary '17 and wife; Ed Tuttle and wife; and **Don Kendall,** of Arlington, N. H. Bill Neuberg and wife were due to arrive Friday, but had not up to our checkout time. (Trust you made it Bill and that your Rotary card got you a reservation, as I couldn't.) . . . **Ray Brooks,** Summit, N. J., advised on his card: "Ruth to hospital August 31, if she is able to go by October 7, we will just have to take what is available then—best to all." (Sorry you did not make it—speedy recovery.) . . . Another wish for a speedy recovery to **Dean Parker,** who writes, "Ill in hospital with sudden blood clot in leg, on my way to M.I.T. Alumni Council September 8." . . . On September 26 we received a note from **Ray Stevens** which reads as follows: "**Ray Blanchard** is in the Melrose Hospital, Melrose, Mass. He suffered a shock during a visit there last week in his capacity as president of the hospital. I understand he will be back for the 48th; he has done great things for the hospital in raising funds and organizing management." . . . Stimulating prizes were given to two golfers, **Ray Maeder** for most improvement, and Ray Stevens for high score. Prizes were also given to Bill Williams and his wife Eddie of Vicksburg, Miss. for traveling the farthest; to Don Severance and his wife; to Mrs. **Heinie Gartner** for being traveler's aid on their tour; and to Al Lunn for his absent wife. . . . Don Severance gave a report on the Institute and answered several good questions. There was a unanimous vote for having the 47th Reunion and for the coming 48th—time and place were left open. Suggestions such as Mexico City; Hershey, Pa., Cooperstown, N.Y.: Sky-Top in the Poconos and even Bermuda were offered. There was one important meeting, reviewing the 50 Year Class Gift Fund, on which more information will be forthcoming. Friday morning immediately after breakfast, a group picture was taken. Then departures began, ending around 3:00 p.m., when the Equinox House was taken over by some 400 Rotarians.

Don Severance received a letter dated September 20 from Conchita **Lobdell,** San Carlos, 86 Mexico, 20, D.F. Here are some extracts therefrom: "Somehow it seems to me at times that I am still living among all the dear friends in Massachusetts and they are very close to me. Yes, they certainly are very close to my heart. On the whole I have been well, and now already settled, as you may know, by the Dandrows, who were here last March. It was wonderful to have had their visit, and wish they could do it more often. There have been other friends, and, although they have not stayed with me, it has been a great joy to have seen them, but no visitors in the past months, although I hope during autumn and winter some might come. I had the opportunity for a job and I decided to take it. I feel happy for that because I have my time and my mind busy. It is really challenging work and the same field I was in before. One of the nice things about it is I work from 9:30 A.M. to 2:00 P.M. As

I have been receiving the Technology Review, I have been informed on some of the events at M.I.T." (Conchita does not confirm this, but we have been told she is honorary vice-president of the M.I.T. club of Mexico.)

Out of our class enrollment of approximately 360, some 146 classmates, 42 per cent, can take satisfaction in the fine results of this past Alumni Fund Drive. We aim for 50 per cent participation in 1964. Our average gift of $112 is significant, and could cause some token gifts to be increased. . . . Instead of the usual closing story, let us put in a plug for New York where the World's Fair will continue next spring. New York is also the home of the M.I.T. Alumni Center which is the biggest value in town. Dues are only $4 a year. Of course, if you make frequent use of the facilities of the Alumni Center there is a small extra service charge. **Dick Loengard** is on the Board of Trustees and will be glad to hear from all of you. . . . A round table is reserved for luncheon in the center dining room at the Chemists' Club, 52 East 41st Street, New York City every day. In addition, the Classes of '16 and '17 hold a joint luncheon in the Frasch Room on the first Thursday of the first full week of each month. Do try to join us.—**W. I. McNeill,** Secretary, 107 Wood Pond Road, West Hartford, Conn.; **C. D. Proctor,** Assistant Secretary, P.O. Box 336, Lincoln Park, N.J.

'18

To those of the brethren who objected to what was said in this column last month about Charles Darwin having deprived us of pride in our ancestry, my reply is, "Take your choice. It's either monkeys or mud." The Boston Sunday Globe of August 23 had an article about **Sam** and Narcissa **Chamberlain,** and there was neither mud slinging nor monkey business about it. The Chamberlains, so the article says, sailed in early July for a summer long jaunt through France, stopping often to dine on the food of the region, taste the wine, the cheese, the shellfish, and the pastry. They are leisurely travelers, for he sketches and photographs the buildings and the countryside. Stored under the front seat of the compact car are several dozen film holders for the heavy 5x7 Linhof view camera he insists "prevents distortion when photographing castles and estates." The back of the car is heaped with tripod, suitcases and Mrs. Chamberlain's notebooks, cook books and the European cooking utensils she'll bring home to Marblehead. This unique working team knows Europe's finest dining, its kitchens and chefs. They chose the best from France, Italy and Great Britain for their four summers of dining in the country, and a full year of recipe-testing and writing in Marblehead. "British Bouquet," published by Gourmet Distributing Corporation in New York, is their newest volume. It visits Britain county by county, seeking out the towns, historic sites and architectural treasures. It names a few country inns and hotels of hospitality and good cheer. It is a book about the provinces, but it ends in London with a brief guide to the epicurean strongholds of the capital. Breakfast was the Chamberlain's "most cheerful meal." It always included marmalade and tea or coffee. Sometimes they found to their delight "the most delicious finnan haddie." In Wales they sampled Caerphilly (pronounced care-filly) cheese, now available in the United States. Obviously, the monkeys had to come down out of the trees for such delicacies, and who ever said, "Here's mud in your eye," before helping a spot of tea to gurgle down his throat?

The Alumni Office has sent me pages 632-633 of the August number of the American Journal of Physics containing an article by one Malcolm K. Smith. The content thereof is muddy with buoyant mathematical symbols, now beyond the broken fragments of our formal schooling. We would be honored by the presence of so shining an intellect among our numbers, but I am tempted to rush sobbing into the night because I cannot either remember or identify him. We had at least ten Smiths in the class at one time or another, six of whom will never swing a limb again, say nothing of swing from one. The Alumni Register lists **Malcolm H.** as a Course VI aspirant of ours. The roster I have goes from Arthur to Winthrop, ignoring Malcolm altogether. Since the erudite author referred to gives the Science Teaching Center at M.I.T. as a base for his thinking concerning the quadratic dependence of the period of a pendulum on its amplitude, the mystery should be easily solved by The Review calling M.I.T. extension 4849. Despite the serious water shortage, an adequate mud pie awaits any editor who tries to make a monkey out of me by deleting this paragraph to smother a mistake which I passionately hope is not mine. . . . **Clarence Fuller** has a busy telephone. On September 27 your scribe had the bright and precious opportunity of addressing the student body of an institution of learning in Norton, Mass. Four times we called him in Foxboro only to hear the imperturbable beep of a busy signal. We suppose Clarence to be still active with sales for The Foxboro Company. Anyway, if we remember correctly (and we do because we made a note about it at the time of our reunion in 1963), he is deeply intrigued with ancestry now retreating into the misty past. He can trace his genes back for nine generations. This unremitting diligence reaches all the way to London. Eight of those nine generations lived in Rehoboth, Mass. It is a small town, little given to excitement, which turns out to be half way between Taunton and Providence. Searching deeds, probate court records, and town registers, Clarence discovered among other things that Rehoboth is a Bible name meaning, "The Lord has made room for us." There was a population explosion in those days, with bigger families of children than we produce, but the Lord had made so much room that the detonation was taken for no more than a dull thud. So far, Clarence has written up three of those nine generations and is working on a fourth, looking meanwhile with longing eyes toward a new volume for the Massachusetts Genealogical Historical Society on Beacon Hill. He declares that no family scandal has turned up so far, though the old records of the 1600's were composed of imaginative spelling, and poor handwriting. Occasionally in such documents a town clerk would reveal ignorance or else a hazardous delight by entering someone as, "presumed to be the son of."

He now works for Armstrong Rubber, but for the first 34 years after whatever evolution resulted from his contact with M.I.T., **George Sackett** worked for Goodyear. By being on a plantation in Sumatra from 1929 to 1932, he got closer to the natural habitat of our more remote ancestors than most of us ever will. He watched a tiger from his automobile and once was greeted by a cobra in his bathroom. Near the edge of the jungle, while reconnoitering the plantation with his wife one day, George saw a big orangutang, whose forebears refused to share their size and power with us. Under such circumstances, "Walk, don't run to the nearest exit," is a must. To run is to soon become mud again. George has five grandchildren, has been around the world, and in every continent except Australia. He thinks that the United States is the best place of all, even if the good Lord, with the hand of His creative love, didn't put the Garden of Eden here. —**F. Alexander Magoun,** Secretary, Jaffrey, N.H.

'19

The Class of 1919 had its 45th Reunion at Chatham Bars Inn, Chatham, Cape Cod. Thirty-five classmates, 22 wives and one daughter attended. Arrivals started Friday, June 12, and many stayed through Monday. Some of the boys and girls played the Chatham Bars Inn golf course and Eastward Ho, a really billy goat course. Saturday night's banquet was a high spot, when Vincent Fulmer, a Vice-president and Secretary of M.I.T., gave us a fine review of what is going on at M.I.T. with charts and illustrations hot off the press. We all had a good chance to visit with our former classmates and their wives. The 45th seems to be the time when many of our classmates are retiring from active front line service and much of the conversation was a sharing of how and what and why for retirement. The reunion was pronounced a great success by all. Many want another get-together prior to our 50th, probably in 1966. The following is a list of those who attended: Will and Mrs. Langille; Don and Mrs. Way; Jim Strobridge; Ark Richards; Marshall Balfour; Louis and Mrs. Grayson and daughter; Milt and Mrs. Loucks; Phil and Mrs. Rhodes; Al and Mrs. Hough; Leslie and Mrs. Jackson; Maurice and Mrs. Role; Dan and Mrs. Hall; Ed and Mrs. Flynn; George and Mrs. McCarten; Paul and Mrs. Sheeline; Ben and Mrs. Bristol; Jack Stevens; George Bond; Dean Webster; Ev and

Mrs. Doten; Leo Kelley; Russ Palmer; Izzie and Mrs. Paterson; Lloyd and Mrs. Sorenson; Walter Walworth; Ed and Mrs. Adams; George and Mrs. Michelson; James and Mrs. Holt; George and Mrs. McCreery; Art and Mrs. Kenison; Bill Bennett; Fred E. Claflin; Harold McIntosh; Paul and Mrs. Blye; and Gene Smoley.

Alumni Day attendance Monday at M.I.T., Cambridge, follows: Edmund and Mrs. Adams; Royden Burbank; George W. and Mrs. McCann; Everett and Mrs. Doten; Albert and Mrs. Kaufmann; Arthur and Mrs. Kenison; Milton and Mrs. Loucks; George and Mrs. McCreery; Paul and Mrs. Sheeline; H. Stanley and Mrs. Weymouth. Your secretary had to leave the reunion early Sunday morning to attend his daughter's college graduation exercises. . . . Your secretary attended the 1964 Alumni Officers' Conference at M.I.T. September 11 and 12, and found another '19 man, **Maurice Goodridge,** in attendance. This was followed by the M.I.T. Alumni Seminar, September 12, 13, 14 on "Man and his Universe," "The Mind of Man," "Man and Society" and "Man's New Responsibility." At this most interesting and stimulating seminar, I was joined by **Marshall Balfour** and his wife. . . . The Class of '19 is having a dinner in New York on Wednesday. October 14. . . . We were sorry to hear that Mrs. Jo Ann **Langille** fell and broke her leg. She is progressing but it is a slow and tedious recovery. . . . **Isidor Slotnik** of Newton has been appointed to the City of Boston's Government Center Commission. This commission is responsible for construction of the new City Hall and each of its seven members will serve until the facility is completed. Mr. Slotnik is widely known in the construction field and is active in community affairs.

We have received notice of the death of Mrs. **Margaret Pierson Olfene** who studied at M.I.T. in 1919. At the time of her death she was head social worker at the Tewksbury State Hospital. She received a master's degree from Boston University in education and rehabilitation and was active in the Wellesley and M.I.T. alumni associations. We have change of address notices for the following and print the new addresses: **Richard S. Holmgren,** 3511 Camino Del Rio, San Diego, Calif. 92120; Professor **Norman T. Bourke,** Municipal Yacht Basin, Daytona Beach, Fla.; **Richard H. Coombs,** Route #6, Brainard, Minn.; **Leon I. Snow,** Sarasota, Fla.; **Ervin M. Kenison,** P.O. Box 301, Bradenton, Fla.; **Frank P. Reynolds,** 521 West Venice Avenue, Venice, Fla. 33595.—**Eugene R. Smoley,** Secretary, 30 School Lane, Scarsdale, N.Y.

'20

Response to the August announcement of plans for the 45th Reunion has surpassed all expectations. Detailed information has been supplied to all those who requested it—more than three score and ten—and it looks as if we might tax the capacity of The Red Lion Inn, so if you are one of those who haven't been heard from and there is even a remote chance that you will be with us next June, do not fail to let me hear from you. Right now, we can tell you that this is going to be the best reunion ever. . . . News, some good and some bad, has been trickling in as a result of the reunion letter. As would be expected, a member told of recent retirement. As **Al Doe** puts it: "My greatest achievement since passing calculus was to retire. My exasperation at those who reached the days of indolence ahead of me is gone—a new watch and view from Cloud 9 were marvelous for one day?" . . . **Irv Wilson** says he retired from General Electric six years ago, he and his wife are still active and three children and 13 grandchildren keep the old man busy. He says his golf is now limited to four days a week! . . . **"Snug" Etter** says he retired in June, 1962, but still does some consulting work for Air Reduction and others in California. He also raises funds for the Boys Club of San Mateo and is another whose children and grandchildren help to keep busy.

Our **Bob Sumwalt** also retired in June, 1962, and became president emeritus of the University of South Carolina after serving for 36 years as professor, dean of the College of Engineering and for the last five years as president. He is now consultant to the U.S. Postmaster General and vice-president of Freedoms Foundation. . . . **Francis Sears** retired as Appleton Professor of Natural Philosophy at Dartmouth, but continues to teach on a part time basis. Revisions of his textbooks in physics keep him busy and he is writing a new book on relativity. He and Mildred, who now make their home in Norwich, Vt., took a trip around the world last winter. . . . **Marion Sanders,** the squire of Wytheville, Va., reports himself retired, in good health, active in local civic work, the Rotary Club and other organizations. . . . **Karl Bean** has just retired from his long career with Consolidated Rendering Company and is enjoying his new home at 16 Orchard Circle Bedford, N.H. . . . **Bob Warriner** has retired from William Carter Company of Needham, Mass., after nearly 40 years with that fine old firm. He has been doing a lot of traveling this year and is just back from three months in England.

Harold Hedberg has retired as vice-president of Albany Felt Company after 40 years spent mainly in manufacturing, R & D, and general administration, including spending the year before last in France as manager of a new subsidiary there. He reports a daughter, a son and up to now, five grandchildren. . . . **Don Dowling** reached formal retirement age last year in November but was retained as full time consultant by his firm Roots-Connersville, in Connersville, Ind.—"mostly involved with high vacuum." . . . **Stan Reynolds** retired from Ebasco in January, 1962, but has carried out a couple of assignments for others since. He has been touring New England and the Maritime Provinces. . . . **Jack Logan** retired in 1961, is a member of the School Board of Bedford, Pa., and delves into local history. He and his wife fixed up an old house there. Jack says **Art Grosscup** and his wife stopped in to see him last summer and he wishes other classmates traveling down the Pennsylvania Turnpike would do the same. . . . **Heinie Haskell** writes from Moosup, Conn., that his business is more and more in South Carolina. He says he saw "old" **Jim Gibson** at Bucks Harbor last summer while anchored there, has "no nurse or wheelchair yet, 11¾ grandchildren, of which 10 are girls." Can anyone in the class match this record? . . . **Charles Carleton** writes from Clarksdale, Miss., that he is still making cotton insecticides. He says, although he is a New England Yankee, he likes Mississippi and its people. . . . **Roy Campbell** is head of the Biology Department at Salem College, Winston-Salem, N.C. He spends his summers in Bath, Maine. . . . **Dick Gee** says he had a visit with **Al Burke,** Ed Ryer, Jack Kellar, Roger McNear and their wives at Mich Bawden's in Duxbury last September. He put the bee on all of them to come to Reunion. Good for you Dick!

Henry Massey says he is semi-retired, has an office in Montclair, N.J., as a finance broker. His present address is 81 Porter Place. . . . **Horace Frith** says his health does not permit reunion attendance but he does very well if he takes it easy. He moved from Crewe, Va., to St. Louis, 1028 Ross Avenue, Creve Coeur. He sends regards to "all the boys that were in Company K in 1918" when he was first sergeant. . . . **Pete Ash** also has had trouble with his health but vows he will attend reunion if he possibly can. His wife, Olive, passed away last April. The Class sends its deepest sympathy to Pete. . . . **Hubert Krantz** is in Springfield, N.J., 4 Fernhill Road. . . . **Arthur Dopmeyer** has moved from Houston to Melbourne, Fla., 840A North Oak Street. **Charlie Klinger** has moved from Milwaukee to Phoenix, Ariz., 4310 East Keim Drive. . . . **Sam Schenberg,** Director of the office of Science Education, Board of Education of the City of New York, says he spent four weeks at M.I.T. last August working with a group of engineers on an engineering course for highly able high school students. . . . **Arthur Merriman** of 2184 Westminster Road, Cleveland Heights, says he is retired but still working as an associate in the local office of James Talcott, Inc., industrial financing, equipment leasing, etc. His son, Arthur Jr., is a graduate of Yale, his daughter Frederika, a graduate of Sweetbriar. He has four grandchildren, two boys and two girls, and he hopes one of the boys will go to M.I.T. How many others have that hope?

It is my sad duty to report that **Howard Field** passed away February 24 and **W. D. MacKay** died some five years ago. . . . **Raymond Perry** of Smoke Rose, N.J., died on July 16. Other prominent classmates whose loss will be keenly felt by us all are **Walt Sherbrooke,** who died on August 12, and **Hank Couch,** who died July 26. His wife Gladys wrote: "He suffered his first heart attack in April and from that time on his health declined. A

year ago he was enjoying the usual vigor of his love for an active life." Needless to say we shall sorely miss Henry and Walt and the many other well loved classmates who have passed on, and shall pay silent tribute to them at reunion. . . . Your secretary is writing these notes in San Rafael, Calif., where he and his Amy are "baby sitting" for their daughter who is touring Europe with her husband. The grandchildren are David, 10, Linda, 8 and Harold Scott Kopperud, 6. Their son, Holbrook, of Short Hills, N.J., has a son Douglas, 2. . . . Let us hear from you.—**Harold Bugbee,** Secretary, 21 Everell Road, Winchester, Mass. 01890.

'21

Honors and recognition continue to come to members of this prominent Class of '21. For the second time, a member of the class has been singled out by the M.I.T. Alumni Association to receive the highest award which can be bestowed upon an alumnus, the Bronze Beaver, which was presented to **Joseph Wenick** of 37 Cedars Road, Caldwell, N.J., during September at the fifth Alumni Officers' Conference in Cambridge. Joe has been treasurer of the M.I.T. Club of Northern New Jersey for about a dozen years as well as a member at large of the Alumni Council, an educational counselor in his home area for the M.I.T. Educational Council and a member of the scholarship committee of the New Jersey club. Early this year, he was general chairman of the full-day symposium in Newark, N.J., on "Engineering, Science and Education for Tomorrow," which was jointly sponsored by Technology as a pioneering effort on behalf of the secondary schools and by the New Jersey club as its contribution to the state's tercentennial observance. Joe has retired as chief engineer for Lightolier, Inc., and is adding to his Institute responsibilities by accepting re-election as treasurer of the local club in its 30th anniversary year and as representative on the Alumni Council for the M.I.T. Club of Virginia. . . . **John G. Lee,** retired director of research, United Aircraft Corporation of East Hartford, Conn., was honored with the award of the degree of doctor of science by the University of Hartford at last June's commencement exercises. John has taken a great interest in the university. He is credited with a major role in the establishment of the university and has served as chairman of its board of regents since the university received its state charter in 1957. He is the author of the book "Fighter Facts and Fallacies" and of many articles in the aeronautical field. He continues to serve United Aircraft as a member of its research science advisory committee. . . . The "Illustrated London News" has recognized the marine craftsmanship of **Irving D. Jakobson,** Vice-president of the Class of '21, and has published a startlingly good photograph of the "Bounty" with many notables aboard, as viewed by the American public on television and reported in these columns earlier this year. The photograph is captioned: "H.M.S. Bounty, or rather the film replica for 'Mutiny on the Bounty,' sails from the Jakobson Shipyard in Oyster Bay, N.Y., en route for the World's Fair marina at Flushing Meadow. She has already completed 50,000 miles of sea journey." In his capacity as honorary secretary of the Institute and regional chairman of the Long Island area, Jake represented M.I.T. in the academic procession and related ceremonies attending the inauguration of Ralph Gordon Hoxie as chancellor of Long Island University last October. What a busy life?

Our Assistant Class Secretary, **Edwin T. Steffian,** received the plaudits of the "Boston Sunday Herald" last July in a full-page feature article, showing a large number of interior views and an exterior of the first of 108 housing units he designed and which are now under construction. These are the first privately financed low and middle income apartments to be built in the Boston area. Known as the Forest Hills Street Apartments of Jamaica Plain, they were designed by Ted's architectural firm, Edwin T. Steffian and Associates, to avoid the "barracks-like" monotony of the usual project appearance. They offer 900 square feet of living space, including two bedrooms, for a rental of $118 per month. . . . **Sumner Hayward** phoned a special report on the Alumni Officers' Conference in Cambridge, which he attended along with George Chutter, Ed Farrand, Warrie Norton, Ray St. Laurent, Ted Steffian and Joe Wenick. Some of this group were quartered in the Irving D. Jakobson suites in Baker House. **Ed Farrand** also wrote to your Secretary to say he was staying over in Cambridge to continue some additional efforts in behalf of the Class of '21 and would be unable to join us in a visit to the World's Fair. **Ray St. Laurent** wrote that he and Helen, George Chutter and Ed Farrand attended the stimulating Alumni Seminar on "The Nature of Man," which followed on the heels of the Officers' Conference. He says that Professor and Mrs. John T. Rule, '23, were host and hostess at one of the tables at the Faculty Club dinner; also that **George Chutter** is planning to retire at the end of this year and move from his Portland, Conn., home to Sun City, Calif. Welcome to the club, George! **Chick Kurth** has been appointed Special Gifts Chairman for the Amity Fund in the Boston area.

Harry Cole says his new home address is 2707 Westgrove Lane, Houston, Texas 77006. . . . **Robert** and Bertha **Cook** have made the seasonal trek from their Canandaigua, N.Y., summer home to their winter quarters at 633 Royal Plaza, Ft. Lauderdale, Fla. . . . **Paul L. Hanson** of Electron Industries, Inc., San Carlos, Calif., reports moving his home from Redwood, Calif., to 1804 Hilman Avenue, Belmont, Calif. . . . **Arthur W. Morse,** formerly of Brookline Farm, Greenwich, Conn., now lives at 55 River Street, Stamford, Conn. . . . **James S. Parsons** has corrected his address to read 1 West 54th Street, New York, N.Y. 10019. . . . Sumner Hayward continues as our star reporter with the news that he phoned **Mich Bawden** in Duxbury, Mass., during his vacation trip to that area last summer. Mich said he was enjoying golf and good health. Sumner and Betty visited with **Norm** and Betty **Patton,** who were vacationing at Brewster, Mass. A later report from Betty Patton advised that Norm had returned to the University of Pennsylvania Hospital in Philadelphia for several weeks of treatment. Early in October, the good news came that Norm had returned to his home, R.D.2, Overbrook Road, Dallas, Pa., and was also going back to his business duties with the Blue Shield in Wilkes Barre, Pa. Betty Hayward was next reported in the hospital for surgery, and we are glad to add that Sumner's latest bulletin says that the active former secretary of the Simmons Class of '23 is home again and well on the road to recovery. . . . In reporting on the Thai royal family last month, we neglected to give the names of the current rulers—King Bhumibol Daulydedej and Queen Siriket. Right, Saul?

It is with deep sorrow we record that **Joseph Lincoln Gillson,** former chief geologist for DuPont and 1960 national president of the American Institute of Mining, Metallurgical and Petroleum Engineers, died on August 4, 1964, in Carlsbad, N.M. Sincerest sympathy is extended to the members of his family on behalf of the entire Class of '21. Joe was born in Evanston, Ill., on February 12, 1895. He prepared at New Trier High School and received the B.S. degree from Northwestern University in 1917, having graduated "magna cum laude" and with membership in Phi Beta Kappa. Following service in World War I as a lieutenant (j.g.) in the Pay Corps, U.S. N.R.F., he returned to Northwestern for the M.A. degree in 1920. Next he earned the M.S. and Sc.D. degrees in Course XII at M.I.T., also serving as an instructor at Technology and as junior geologist for the U.S. Geological Survey. In 1929, he resigned his assistant professorship at the Institute to join E.I. duPont de Nemours as chief geologist, a post he held until his retirement in 1960. His work took him over much of the world in search of many raw materials. He spent one year as special geological adviser to the government of Travancore, India. On retirement from DuPont, Joe returned to Technology for a two-year term as visiting lecturer in economic geology. He then accepted an appointment as professor of geology at the University of Arizona and was serving in this capacity at the time of his death. He had recently been the technical adviser to the American Delegation to the Geneva Conference on Science and Technology for Underdeveloped Nations. He published more than 30 important papers and was especially known for his work on titanium occurrences in placer and non-placer deposits throughout the world. He was honored by the A.I.M.E. in 1957 with the Daniel C. Jackling Award for "his significant contribution to the advancement of economic geology, his leadership and his keen sense of professional responsibility." He also received the A.I.M.E. Hal Wil-

liams Hardinge Award in 1963 for "pioneer work in industrial mineral resources, for wide dissemination of useful data thereon and for generating systematic effort within this field." Joe's outstanding long service to A.I.M.E. won him great popularity and esteem. Among his many assignments, he was variously chairman of the Industrial Minerals Division, chairman of the Gifts Committee for the United Engineering Center, editor-in-chief of the third edition of "Industrial Minerals and Rocks," national vice-president and director and, in 1960, the national president of the A.I.M.E. He was also vice-president of the Mineralogical Society of America, president of the Society of Economic Geologists and president of the American Geological Institute. He was a fellow of the Geological Society of America. His memberships included Alpha Delta Phi, Alpha Chi Sigma and Sigma Xi. He is survived by his wife, the former Grace Brown; a son, Joseph L., Jr., who attended the University of Delaware; two daughters, Mrs. Jane Gillson Langton, a graduate of the University of Michigan, and Mrs. Patricia Gillson Baker, an Oberlin alumna; and four grandchildren. We are indebted to Jim Phinney, Executive Secretary of the M.I.T. Alumni Center of New York, for his aid in preparing these notes.

Gift time has arrived again and your aging Secretaries would like to be deluged with generous portions of news from you, dear reader, with which to carry this column adequately through the remaining seven issues of this volume of The Review without the laborious sleuthing efforts required to circumvent your silence. Please write us a full and correct story of your doings, travel, family, now! Meanwhile, all of your class officers and committeemen join in a cordial extension of sincere Holiday Greetings to you and to your loved ones.—**Carole A. Clarke,** Secretary, 608 Union Lane, Brielle, N.J. 08730; **Edwin T. Steffian,** Assistant Secretary, c/o Edwin T. Steffian and Associates, 376 Boylston Street, Boston, Mass. 02116.

'22

We have our usual Indian summer in Buffalo with beautiful fall colorings and perfect golf weather, but we are making plans for December golf to be played in Augusta under hoped-for warm, sunny skies. Past experience has taught us however, that weather has nothing to do with the score. We are happy to report an honors recipient from the American Society for Testing and Materials as **Earl R. Thomas,** Manager of the Meter and Test Department of Consolidated Edison Company of New York who received their Award of Merit 1964. Earl is a past chairman of the ASTM, New York District, and is chairman of the Committee on Electrical Insulating Liquids and Gases. He is also a member of the National Academy of Sciences National Research Council, American Standards Association, American Nuclear Society, and a fellow of the Institute of Electrical and Electronic Engineers. Because of his work in the experimental employment of radar controlled landing assistance for aircraft in 1945, he received an Army Commendation Medal from General Arnold and was made an honorary officer of the Military Division of the Order of the British Empire by the King of Great Britain in 1946. Mr. Thomas is the author of numerous technical papers on cable, transmission and distribution systems, fault locating systems, electrical testing and gas detection systems.

Dr. **Francis G. Wells** has received a citation for distinguished service from Stewart L. Udall upon his retirement from the Bureau of Geological Survey of the Department of the Interior, after 35 years of service. The recognition was for his outstanding accomplishments as a scientist and his service to the government. Dr. Wells' present address is Clifton, Va. . . . A note from Portland, Ore., carries the announcement of the election of **Crawford H. Greenewalt** to the Board of Directors of The Boeing Company. . . . **Oscar H. Horovitz,** our Assistant Secretary, has declined an invitation to show his films in Buffalo as he hopes to spend the winter in some distant warm vacation land. He states that he has a fine travel film in color of Africa covering Dakar, Accra, Republic of South Africa, Victoria Falls and Kenya. Perhaps we can count on him in the spring. . . . **Clayt Grover** has written about the most interesting Alumni Officers' Conference in Boston last September. He also enclosed a clipping telling of the heart attack and death of **N. Conant Webb** of Montclair, New Jersey. Conant was a retired executive of a stevedoring company and had recently served as a town commissioner as director of parks and public property. He was active in the Maritime Association and the New York Shipping Association. Mayor Robert M. Ferris said "Montclair has lost one of its most valued citizens. Mr. Webb has served in many capacities with an outstanding record of public service. The Town feels a tremendous sense of loss." Our sympathy goes to his family.

A letter from Frank Boynton, '15, tells of the death of **Mark W. Ellsworth** in Pasadena; they both had been members of the Pasadena Architectural Club for many years. Our sympathy is extended to his wife and two sons. . . . A study of the 1964 M.I.T. Alumni Fund Report indicates a strong representation by the Class of '22. The amount of our contribution is the highest and the percentage contributing most satisfactory. . . . Among the change of addresses received are **Clarence E. B. Coleman,** La Jolla, Calif.; **Maurice W. Williams,** Castine, Maine; **Laurence R. Culver,** Melbourne, Fla.; Colonel **Duncan G. McGregor,** Bradenton, Fla.; **Theodore P. Shlikoff,** Guntersville, Ala.; **Wilfrid M. Thomson,** San Francisco, Calif. The sincere sympathy of our class is extended to the family of **Norman P. Randlett,** of Laconia, N.H. . . . Our item for those north of the Mason-Dixon line is put on snow tires and keep off skis.—**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N.Y. 14203; **Oscar Horovitz,** Assistant Secretary, 33 Island Street, Boston 19, Mass.

'23

Horatio Bond reports that he received the announcement of the marriage of the daughter of Mr. and Mrs. **John Ward Beretta** (Mary Austin Rutherford) to Walter Klingman on September 5, 1964. . . . A picture of **Cecil H. Green** and Mrs. Green of Dallas, Texas, inspecting the $6 million M.I.T. Center for Earth Sciences appeared in the Boston Herald on October 2, 1964, the day the structure was dedicated. The 20-story building was made possible by a gift of $6 million from the Greens. . . . **Forrest G. (Frosty) Harmon** of 1230 Oaklawn Road, Arcadia, Calif., passed away on September 26, 1964. It is reported that he had a heart condition caused by a defective valve. A native of Greenfield, Mass., he had been a resident of that area for the past 19 years. He was president of Tubesales, with offices in Los Angeles, New York, and London. He was on the vestry of St. Edmund's Episcopal Church and a member of the Jonathan Club of Los Angeles, the Bohemian Club of San Francisco and an active member of Steel Services Center Institute. He is survived by his wife Helen Harmon; a daughter, Mrs. Marvin Spencer of Big Pine, Calif.; two sons, Chris Harmon of Morovia and Wilson Harmon of Arcadia; six grandchildren and two sisters. . . . **George A. Johnson** reports that 38 per cent of the class contributed to the 1964 Alumni Fund. Of the total Alumni, 38 per cent contributed $968,880. The goal is $1,500,000 in 1965, which is the Fund's 25th Anniversary. . . . **Bertrand A. McKittrick** has been elected to receive the 33rd degree, honorary, of the Supreme Council, Ancient Accepted Scottish Rite of Freemasonry, N.M.J., U.S.A. This degree will be conferred at the next annual session which will be held in Cleveland, Ohio, September, 1965. . . .

Time magazine for August 14 carries a picture of **P. Y.** (for **Ping Yuan**) **Tang** and an interesting account of how he met a threat of financial disaster to the textile industry in Hong Kong, due to embargoes by the United States and other countries, by imposing voluntary production controls, skillfully negotiating export quotas with other countries and increasing variety and quality. The firm that has contributed most to the prosperity of Hong Kong's textile industry, and profited most from it, is South Sea Textile Manufacturing (Tang's creation), the colony's biggest spinner and weaver. . . . The following classmates attended the Alumni Conference at M.I.T. on September 11 and 12: George W. Bricker, Jr., Ronald D. Brown, Bernardo Elosua, Eduardo Icaza, Forrest F. Lange, Albert S. Redway, Thomas E. Rounds, Jr., Julius A. Stratton and Alexander J. Tigges. One of the conference sessions attended by your secretary-treasurer was held in the large lecture hall of the new Earth Sci-

ences Building. It was the first meeting to be held in that lecture room. Windows on two sides of the room are darkened automatically by pushing a button. . . . A change of address has been reported for **Harry Green,** 44 East 67th Street, New York, N.Y. 10021.—**Forrest F. Lange,** Secretary, 1196 Woodbury Avenue, Portsmouth, N.H. 03801; **Bertrand A. McKittrick,** Assistant Secretary, 78 Fletcher Street, Lowell, Mass. 10852.

'24

Retirement Notes: **Walt Gress** seems to be a perennial retiree. A few years ago he retired from the City of New York Water Supply Board. Then he went across the river to work on a State of New Jersey program of development of water supply projects for the northeast area of the state. After five years he retired again. This was July, 1963. That lasted for six months. It was, he says, "a state of purgatory." So he went back to work for the consulting firm of Malcolm Pirnie Engineers, and his very first assignment was in his old home town, Yonkers. Full cycle. . . . On October 1 **Elmer Hutchisson** retired from his post as director of the American Institute of Physics. He will return to the position of editor of the Journal of Applied Physics which he founded and first edited. . . . **Bob Stewart** had been a vice-president of the Singer Manufacturing Company for the last decade. On September 1 he retired and moved to the hills of Hancock, N.H. . . . And it looks as though **Leigh Fogg** has done the same thing. He was with Kennecott Wire and Cable in Rhode Island for years. Now he is living in Gorham, N.H. Since that's a long commute, retirement seems a logical conclusion.

High Honor: From the AEC comes a news release, "Mr. **Hood Worthington** Named to Receive USAEC Citation." It was presented in Washington on August 24, "accompanied by a symbolic medallion." The citation speaks for itself: "Hood Worthington, Distinguished Scientist and Administrator, for his outstanding participation in, and meritorious contributions to, the mission of the United States Atomic Energy Commission in his capacity as Chief Supervisor and Process Manager at Hanford for 15 months during World War II and for 14 years as a leader in development of the Savannah River Plant operated for the AEC by E.I. duPont de Nemours and Company, Wilmington, Del. For more than 15 years his vision, guidance, technical knowledge and devoted service to his company and the Commission contributed vitally to the defense of his country." Very impressive indeed, and unquestionably well-deserved. Hood, you will remember, retired from DuPont last December. He was prevented from coming to reunion by a major operation in March. He had not fully recovered by August, but he made it to Washington for the ceremonies.

Indoor Athletics: **Ted Kenyon** taught his wife, Teddy, to fly back in the 1920's. She's been doing it ever since. She was a test pilot for Grumman fighters during the war, is checked out in multi-motors, jets, and helicopters. This and much more came out in a feature story in the Hartford Times (they live in Lyme, Conn.). But the one line that most intrigued your secretary was a passing comment by the interviewer as he sat in their home that it had "such effects as a trampoline in the living room." You may not remember, but Ted was an outstanding tumbler on our gym team. Hope they have a high ceiling.

Business Notes: **Marshall Waterman** is now product planning manager of the Westinghouse lamp division in Bloomfield, N.J. He had been the commercial engineering Manager. . . . **Harry R. Ferguson,** Thiokol's executive vice-president, invented liquid polysulfide, the first liquid synthetic rubber. . . . **Bill Ridge** stopped by recently. He's been with John A. Roebling Sons (bridges, cables, et al) for years, but his card now reads "Director of Operations, Eastern Division, The Colorado Fuel and Iron Corporation." But it's no switch on Bill's part. Just another of those diversification combines. . . . Seasonal Note: The Happy Holiday season approaches fast. May it be a time of rejoicing for all of you. It certainly will be for the Kanes. Our 17-year old daughter has been at a French school this fall. She comes home just in time for Christmas!—**Henry B. Kane,** Secretary, Room 1-272, M.I.T., Cambridge, Mass. 02139.

'25

The 40th Reunion is coming closer, and you are going to hear more and more about it as the days go by. **Dave Goldman,** as Chairman of the Reunion, has many of his committee members hard at work. Those who have agreed to work with him to date are Ed Kussmaul, Fred Greer, Ave Stanton, E. Willard Gardiner and Frank Turnbull. At a meeting, held on September 28, many of the plans were firmed up, and a second meeting will have taken place before you read these items in The Review. Details will be reaching you in the form of special communications. The dates, in case you have not recorded them as yet, are June 11-14, 1965. . . . News items regarding classmates have been gleaned from a variety of sources. Their volume is rather small, however. A recent news release from the Water Pollution Control Federation in Washington, D.C., noted that **Omar C. Hopkins** participated in technical discussions at the 37th Annual Conference of the Federation held at Bal Harbour, Fla., on September 27-October 1. Hopkins is assistant director of the Water Pollution Control Department at Kansas City, Mo. According to our mailing list, he went to Kansas City rather recently from the U.S. Public Service, Division of Water Supply and Pollution Control in Washington.

Ed Harris, who is with Mead Board Sales, Inc. in Lynchburg, Va., represented M.I.T. at the inauguration of Dr. Marion Carey Brewer as the seventh president of Lynchburg College on October 17 of this year. . . . At the 86th convention of the Massachusetts Funeral Directors' Association held recently at the New Ocean House in Swampscott, Mass., **Fred Dolan** was elected vice-president of the association. . . . One of the speakers at a session of the 18th National Conference on the Administration of Research, held last month at Princeton University, was **Karl vanTassel,** President of the A. B. Dick Corporation, speaking on "Industrial Attitudes Toward Research." . . . Other short items noted are the following which should be of interest. **Calvin Campbell** is at present in Europe on a business trip. . . . **Bob Dietzold** is out of the country at the present time—no details. . . . **Win Francis** has been hospitalized for a short period but is now out and around again. . . . **Bob Hodson** was confined to his home for a number of weeks with a heart ailment. . . . **Finley Laverty's** son recently received his doctor's degree in mechanical engineering at M.I.T. and is now teaching at Carnegie Tech. . . . **Bob Reid** is presently on business in Canada. . . . **Bill Steinwedell** is busy in the political campaign. . . . **Don Henderson** and his wife are vacationing in Europe. . . . Two recent address changes are of some interest. **Walter Siddall,** whose old address was Havana, Cuba, is now living at 180 East End Avenue, New York City; and **Eugene B. Groden,** formerly of Belmont, Mass., has the following address: USAEDFER, APO 67, San Francisco, Calif. —**F. L. Foster,** Secretary, Room 5-105, M.I.T., Cambridge, Mass. 02139.

'26

This is the first issue of Class News written from a new location at Pigeon Cove. We had a small building on the property which I started fixing up about a year ago. There is just one room downstairs (plus bath and kitchen unit), a bedroom upstairs and a porch. However, it has the works—beam ceiling, panelled walls, corner fireplace, electric heat, air conditioning and no telephone! It was finished June 1 and Dean Pitré became its occupant until October 1 so this is my first use of it. What a place to sneak off to for an afternoon snooze, but best of all what an environment for writing class notes. As I raise my head to "think," I look through a northeast window and see sparkling white caps on the sea a couple of miles off shore but not in close because Pigeon Cove is in the lee when the bitter wind blows from the northwest. Pausing to look over my right shoulder I see Straitsmouth Lighthouse across the bay but in the foreground a large pot of geraniums, left by Tom Pitré, is still very colorful snuggled in a protected nook in the ledge. We call this little hideaway the Studio and I hereby dedicate it to the Class of '26 as an ideal Class News "office." Now, if I can refrain from gazing out the window I will get down to business. Here is a release from Stone & Webster: "New York—

Duncan A. Crawford has been elected a vice-president of Stone & Webster Service Corporation, one of the nation's large management consulting firms. Mr. Crawford joined Stone & Webster in 1926, following his graduation. In 1943, he moved to Atlanta as a vice-president of Atlanta Gas Light Company and was elected president in 1960. He returned to Stone & Webster in 1961 and now serves on the company's utility advisory staff. Mr. and Mrs. Crawford, the former Grace Whitney of Dedham, Mass., have a son, David, and a daughter, Barbara. The Crawfords now live in Westport, Conn. (15 Prospect Road)." Congratulations Duncan! . . . Here's a letter from C. J. Van Houten & Zoon N.V.—WEESP. The letter is written by the secretary of the company and states, "It may be of interest to you to know that Mr. **Frederick E. Walch, Jr.** '26, has been named president of this company. Mr. Walch continues in his position as vice-president, Europe, for W. R. Grace and Company, Overseas Chemical Division." Well Fred, congratulations to you, too. Does this mean that the Class of '26 will be well supplied with chocolate at our 40th Reunion? Meaning, of course, creme de cacoa! . . . A note from **Pink Salmon** tells us that recently Plimpton Press of Norwood, Mass., was purchased by McCalls. The magazine Book Industry, for August, 1964, carried an item to the effect that **Harry F. Howard** was appointed vice-president of McCall's Plimpton Press Division. It goes on to state that Howard, who remains as secretary and clerk of the corporation, has been with the Plimpton Press since his graduation from M.I.T. in 1926. He is a director of the Book Manufacturers' Institute and chairman of the Massachusetts Apprenticeship Council." Congratulations to you too Harry!

This seems to be the month to hand out kudos, so why not continue? "The Northern Trust Company, Chicago, has announced the appointment of **John H. Wills,** head of the Economic Research Department, as a senior vice-president. Mr. Wills, who joined The Northern Trust in 1943, received his bachelor of science degree from M.I.T. in 1926. He is a member of the American Institute of Banking, American Economic Association, American Statistical Association, American Finance Association, Bankers Club of Chicago, Economic Club of Chicago and the Executive Club of Chicago. Mr. and Mrs. Wills reside at 2514 Marcy Avenue in Evanston, Ill." Good work, Johnny, and congratulations to you too! . . . And here's an entirely different kind of announcement but one which equally deserves the best wishes of the class. "Mrs. Janet Baker Euster and Mr. **Juan Emile Chaudruc** have the honor of announcing their marriage on Saturday, the fifth of September, 1964, at St. Mark's Church, Mount Kisco, N.Y." I guess the proper word in this case is felicitations, but the wish is much happiness. . . . A recent letter from London from our class president, **Dave Shepard,** states, "Dear 'G.W.' Thank you very much for your note about **Don Cunningham**'s acceptance of the job of reunion chairman. I am delighted, and think he will prove to be an excellent choice. Kay and I had a fine vacation in Colorado but were in New York only very briefly indeed on the way to and from London. I hope on another visit I shall have a chance to telephone you at least. We hope the Smiths have had a good summer too. With best regards. Yours sincerely, Dave." When using a lot of quotes it's a little hard to judge space but my guess is that the Class of '26 has used up its allocation and in spite of this nice environment for writing notes it is just too nice to spend all morning at it. So, a Merry Christmas holiday to all.—**George W. Smith,** E. I. duPont de Nemours and Company, 140 Federal Street, Boston, Mass.

'27

Dr. **Harold E. Edgerton** is writing an interesting series of articles for Professional Photographer magazine. The object is to dispel misconceptions about specialized photography with high-speed strobes. "In fact," he says, "many of them are even simpler if possible to use than the conventional portable or studio strobe that is in common use today." The following will be of interest to many: "One never knows when or where a problem will arise where ultra-fast exposure is necessary. As an example, there are many problems in the numerous spraying processes that can be studied effectively with high-speed flash photography. These involve the paint industry, the soap industry, metal working systems, lubrication, and many others. An alert industrial photographer in almost any factory or research laboratory will immediately spot processes or areas where a single-flash photograph made in a microsecond will reveal information that cannot be obtained in any other way." . . . The appointment of **Herbert Parkinson** as executive director of central engineering has been announced by Minnesota Mining and Manufacturing Company. He joined 3M in 1950 and before this promotion was manager of central engineering. . . . The I.E.E.E. Transactions carried an up-to-date outline on **Leslie J. Weed,** who went with Boston Edison Company after obtaining his master's degree in electrical engineering. He became head of the electrical engineering department and now is its staff consultant. My own records show that he is also an accomplished artist, specializing in landscapes in oil. . . . **William J. Rudge** has been named manager of engineering in General Electric Company's new distribution protective equipment department. He is a fellow in the Institute of Electric and Electronic Engineers and in Lenox, where he lives, he is a member of the city finance committee and the library association.

At the Alumni Officers' Conference, held at Cambridge in September, **Dike Arnold,** past president of the Alumni Association, and your class secretary were in attendance. It was recalled that ten years before the first of these conferences was held and Dike was its chairman. . . . **Gordon Calderwood** has received the special thanks of the Alumni Association for work done this year by the Rochester, N. Y., region, of which Gordon was chairman. . . . **Ralph Johnson** received an honorable mention for his work as chairman in Honolulu. . . . The Class of '27 was the fifth highest class in total amount given. . . . This is your last chance to put your class secretary on your Christmas card list and tell him "how-goes-it." —**Joseph S. Harris,** Secretary, Masons Island, Mystic, Conn. 06355

'28

A Merry Christmas to you all, as of October 14, and a healthy, prosperous New Year. **Ralph Jope** was kind enough to pass along a letter he received in August from **Max Parshall,** who, we all know, is professor of engineering at Colorado State College in Ft. Collins. "Dear Ralph. It was nice to see you at Alumni Day although very briefly. The Alumni Day was, again, a very wonderful experience. Mary and I also enjoyed visits with Avery Ashdown, '24, and Irwin Sizer. I had a good visit with L. F. Hamilton, '14. We enjoyed going into the new tall building. Our trip in June extended from Maine, where we visited Mary's mother, to Frederick, Md. We had dinner with **Fred** and Janet **Lewis** after which they gave us a good ride through Boston and Cambridge. We took the "Owl" to New York and were met by **Cole** and Maida **Armstrong.** We were at Morristown with these fine people over the weekend. I had the opportunity to see Cole's office at the Bell Labs, Whippany. We then visited a day with Mary's brother, who teaches physics at Villanova. Then on to Baltimore, where we were met by old friends from Colorado State University. They took us to their home in Frederick, Md., and also to Harper's Ferry; Dr. Glick took me to see some of the facilities at Fort Detrick. We spent a night with Mary's cousin at Hastings-on-Hudson before returning home.

"Dr. Irwin W. Sizer, Biology Department, M.I.T., has been teaching a summer course at Colorado University, Boulder, Colo. He and Mrs. Sizer came to see Mary and me August 13. I set up a tour of the veterinary medicine facilities and a part of the engineering facilities for Dr. Sizer in the afternoon, followed by a small dinner (11) at the C.S.U. Student Center. After dinner we visited at our home. Among the guests were L. V. Baldwin, M.S., '55, Acting Dean of Engineering, and R. D. Haberstroh, M.S., '51, and Ph.D., '64, an associate professor of mechanical engineering."

Ralph also notes that he received a note from **Tom Harvey**: "We just had a new grandson, number two, Craig Thomas by name (Jackson is the last name) who arrived July 9. He and his mother are doing just fine. Gracia spent several weeks with them 'grandmothering.' " . . . Boston newspapers in September carried an interesting article about **Abe Woolf's** wife: Mrs. Abraham Woolf of Brookline is the new president of Boston Hadassah, succeeding Mrs. Charles E. Wyzanski, Jr.

The Chapter has 8,500 members covering Boston, Newton and Brookline. As head of one of the "Big Nine" chapters in the country, Mrs. Woolf will be a voting member of the National Board, which represents more than 318,000 members in the United States and Puerto Rico. The Boston Chapter president directs fund raising activities and dues collections during the year, amounting to more than $250,000 pledged by the chapter for educational work in the United States to strengthen democracy and to foster creative Jewish living, and for projects in Israel for child welfare, vocational schools, land reclamation and the maintenance of the healing, teaching and research work of the Hadassah-Hebrew University Medical Center in Jerusalem. A graduate of Boston Teachers College, Mrs. Woolf is the wife of a consulting engineer and the mother of three sons: Michael, a Harvard graduate with a Ph.D. in physics from the University of California at Berkeley; Stephen, an architect, Amherst and M.I.T.; and Burton, at the Brookline High School. This month the family was increased by the birth of a son to Michael and the marriage of Stephen.

A news release dated August 18 furnishes the following material about a classmate: "Dr. **Julian W. Hill,** who played a key role in the discovery of nylon, the world's first truly synthetic fiber, has elected to retire from the DuPont Company September 30, it was announced today. Following his career in research, he has been executive secretary of DuPont's Committee on Educational Aid. He will be succeeded in this post by Dr. Burt C. Pratt, an associate director of basic sciences in the Central Research Department. Dr. Hill joined DuPont in 1928 as a research chemist with a small group of scientists headed by Dr. Wallace H. Carothers, who was inaugurating a program of fundamental research. In a search for new, basic knowledge, the group was seeking to discover why certain molecules unite to form 'giant' molecules, called polymers. During the course of this work, Dr. Hill found that synthetic fibers could be made from condensation polymers, discovered by Dr. Carothers, thus providing the genesis of nylon and polyester fibers. It was in April, 1930, that Dr. Hill discovered that a molten polyester could be pulled out into opaque filaments. At the same time, he made the significant observation that these filaments could be permanently elongated to become lustrous, oriented fibers stronger and more pliable than the original filaments. These discoveries, stimulating work with many different chemical compounds and many more years of research and development, led to nylon. Dr. Hill also discovered large ring compounds simulating the natural musks used widely in perfumes.

"Dr. Hill and Dr. Carothers published a series of papers on their studies in 1931, making this new knowledge available to the scientific world. Dr. Hill was the author or co-author of 17 papers, including the original publications on synthetic fibers. His name is on 21 patents. His other scientific contributions include chemicals used in moisture-proof cellophane and water repellents. As he continued in research work, he was promoted to research supervisor in 1935 and to assistant laboratory director in 1942. He was appointed executive secretary of the company's Committee on Educational Aid in 1951 and in this capacity he has administered and in large part developed DuPont's program of financial grants to the nation's colleges and universities. In that time, the program has been diversified greatly to meet the changing needs of those institutions and has increased from about $400,000 to more than $1,800,000 for this year. Dr. Hill, who lives at 1106 Greenhill Avenue, Wilmington, was born September 4, 1904, in St. Louis, Mo. He was graduated from Washington University, St. Louis, in 1924 with a bachelor of science degree in chemical engineering, and received his doctorate in organic chemistry in 1928 from Massachusetts Institute of Technology. He is a member of Sigma Xi honor scientific research society, Tau Beta Pi honor engineering society, Alpha Chi Sigma chemical fraternity, and Tau Kappa Epsilon social fraternity."—**Hermon S. Swartz,** Secretary, Construction Publishing Company, Inc., P.O. Box 255, Lexington, Mass. 02173.

'29

Many thanks to all who took time to reply to the questionnaire. The countdown to date shows responses from 197 '29ers out of 667 (about 30 per cent), and they are still trickling in slowly at the rate of three or four a week; please keep them coming as I am sure they will present quite an interesting picture of our classmates' activities and accomplishments during these past 35 years. . . . So far, we have word from '29ers from 31 different states: 60 from New England; 61 from the Eastern States; 18 from the South; 18 from the Midwest; 13 from the Southwest; 2 from Wyoming; 12 from the West Coast; and 10 from outside the USA; so we thought we would start off by reporting news from the farthest corners of the world first. . . . From Tokyo, Japan, we were pleased to hear from **Kiichi Murakami,** who is professor, Industrial and Management Department, School of Science and Technology, Nihon University, and also engaged in metallurgical and consulting engineering. One of his hobbies is traveling abroad, which is well demonstrated by the list of books he has written, namely, "Trip to South America," "Trip to Europe," and "Trip to North America." He is presently writing "Diary of my Round-The-World Trip." . . . **Takanao Kuki** is managing director of Ace Company, Ltd. in Tokyo, importers and exporters, and has had occasion to visit Boston and M.I.T. four times. One of his daughters is now studying at Green Mountain College in Poultney, Vermont. . . . Toyo Otis Elevator Company of Tokyo has as its president **Masaru H. Miyauchi,** who is a member of the M.I.T. Association of Tokyo which has a membership of over 30 and meets six to eight times a year. . . . From Captain **George E. Fischer,** CEC, USN, we hear that he is officer in charge of construction for Southeast Asia. A career in the Navy and extensive travel throughout the world is summed up by George as a "rich experience" though "not blessed with substantial rewards."

Sadik A. Baroudi of Hama, Syria, sent a most interesting resume of his accomplishments. His present title is expert irrigation engineer. He is employed by the Major Projects Administration of the Syrian Government and is part owner and founder of Arab Porcelain Company and is interested in ceramics and agriculture. Greatly devoted to his family of six children, Sadik Baroudi is mainly interested in the best education possible for them and adds an amazing note stating, "I don't feel a day older than 30!" . . . In Paris, we find **Frederic Celler** where Fred is president-directeur general of AMP de France S.A. He is also president of the M.I.T. Club of Paris and director of the American Club in Paris. Perhaps he is an even more avid Mercedes fan now. Fred mentions the "living is quite good" but he misses the Mexican M.I.T. fiesta. . . . **Wally Gale** writes about visiting the Cellers in Paris this summer and says that classmates should look up Fred if ever in Paris (15 Boulevard d'Inkermann, Neuilly-sur-Seine, France). . . . **Jen-Chieh Huang** replied from Taipei, Taiwan (Formosa), where he has devoted 35 years to his objective of developing industry in China and is now managing director of the Cyanamid Taiwan Corporation, a subsidiary of American Cyanamid Company. . . . From Canada we learn that **C. Gordon Clark** is vice-president of Production, Atlantic Sugar Refineries Company Ltd., St. John, N.B. . . . **Richard E. Bolton** is a partner of Bolton, Ellwood & Aimers, Architects, . . . and **Edward B. Papenfus,** a consulting geologist in Vancouver, B.C., is credited with the distinction of being one of four who discovered the Orange Free State Goldfields in South Africa which produce over 9 million ounces of gold annually. . . . We promise more on the questionnaires in the following issues.

Now for a bit of news from the States, we hear that **Fisher Hills** is much confined to his home (243 Islington Road, Auburndale, Mass.) because of illness, so perhaps a line or call from some of his classmates might bring a note of cheer. . . . Congratulations to **Norman L. McClintock** who has been advanced to third vice-president of the Metropolitan Life Insurance Company. . . . **Philip W. Bourne** of Beverly, President of the Boston Association of Architects, was appointed chairman of the Architectural Division of the Greater Boston United Fund Campaign. . . . On October 6 the Institute was represented by **John D. McCaskey** at the inauguration of Robert Porter Foster as president of Northwest Missouri State College. . . . **J. J. Wilson** and his family had a "dream-come-true" vacation cruising on their Danish built 42-foot auxiliary ketch in Scandinavian waters this summer. . . . The second M.I.T. Alumni Seminar in September was a wonderful experience for about a hundred graduates who attended. This in-

cluded many wives who reported as favorably as we engineers.

Our sympathy goes to the family of **Henry L. Newhouse,** who passed away on August 19, 1964, in Evanston, Ill., where he was a prominent architect. . . . That is all for now as I am off on a business trip to Sweden; but since this will appear in the December issue, may I extend my best wishes for the Holiday Season to all '29ers.—**John P. Rich,** Secretary, 67 Berkeley Street, Nashua, N.H.

'30

On September 11-12 your secretary attended his first Alumni Officers' Conference at M.I.T. and found it a very rewarding experience. Institute staff members concerned with alumni affairs presented excellent programs providing many helpful hints to those of us who are engaged in alumni activities. The scientific programs were both stimulating and informative. I didn't realize what I had been missing. . . . In connection with the information forms that are sent to a certain number of you each month, I should like to enter a plea, addressed particularly to those of you who work in the more advanced and esoteric areas of science and technology, for a greater degree of clarity and simplicity in describing your work. While it is doubtless true that the recondite phraseology some of you use is quite clear to the initiated, it is unfortunately beyond the rather limited mental capacity of your secretary, and I am reluctant to include in the notes anything I don't understand. It seems doubtful that you will suffer any really serious loss of dignity by describing your work in simpler terms, and by so doing you will give your less well-endowed classmates a break. . . . This month we have had a communication from **Les Steffens,** who is in the Socony Mobil Oil Company planning department concerned with planning domestic operations. As reported in the December, 1963, notes, he has three daughters; the eldest is teaching in Japan. He has been active in the A.C.S.-sponsored program of science lectures for high school students in his home town (Darien, Conn.). Our XB classmates may recall that Les devoted considerable time to and developed a talent for pool playing at the Merrimac station of the Practice School, thereby, as he says, "dangerously delaying my thesis."

John Sherman is a section head of the technical services department at the Winton Hill technical center of Procter & Gamble in Cincinnati. He has a married daughter, two sons attending the University of Cincinnati, and two grandchildren. . . . **Zareh Sourian** has his own architectural office in New York. He has been "building churches in Italy and Ford agencies and apartment houses in U.S.A." He has a daughter, Gay, who graduated from Radcliffe, and a son, Peter, who graduated from Harvard and is a writer. . . . **Russell Stetson** is with Emerson & Cuming, Inc., in Canton, Mass., doing design, research and development work, both industrial and governmental. His current project is the design of Mach-5 metal/ceramic radomes. His sons, David and Robert, are also employed by E. & C., David in Philadelphia and Robert in Canton. David is married and has three children. . . . **Joe Stevens** is president of J. T. Baker Chemical Company in Easton, Pa. He is a trustee of the Warren Hospital in Phillipsburg and a director of the Manufacturer Chemists Association. His son, Edward, is a third year student at Temple Medical School, and daughter Ellen is a student at Muhlenberg. . . . **G. Franklin (Temp) Temple** is a process engineer in the central production administration of Foote Mineral Company in Exton, Pa. . . . **George Theriault** is maintenance superintendent at Frigidaire's Plant number 3 in Dayton, responsible for installing and maintaining all facilities except tools. One rather intriguing item in George's report indicates that land-locked Dayton has a considerable interest in boating. Apparently, there is an active unit of the U.S. Power Squadron in Dayton, and George is squadron educational officer. . . . The recently issued 1964 M.I.T. Alumni Fund Report reveals that the Class of '30 has again achieved a certain measure of distinction. Of the 20 classes that graduated from 1921 to 1940, our class ranks 20th in amount contributed. Let's try for 19th place this year.—**Gordon K. Lister,** Secretary, 530 Fifth Avenue, New York 36, New York; Assistant Secretaries: **Charles G. Abbott,** 26 Richard Road, Lexington 73, Mass.; **Louise Hall,** Box 6636, College Station, Durham, N.C.; **Ralph W. Peters,** 16 Whitestone Lane, Rochester 18, N.Y.

'33

Well, men, here we go again, and high time. The next two paragraphs were written by our eminent executive vice-president, **Jim Turner.** I am, for the moment, just the middle man. "The program for establishing a scholarship fund in memory of the late Bob Kimball is off to a late, but good, start. For the fiscal year just ended, a total of $20,089 was contributed to the Alumni Fund, by the Class of '33, of which $14,865 will be applied to the scholarship fund. As you know, all contributions during the past year, and the next two years, unless otherwise specified, will go to the Fund. The number of classmates participating increased from 33 per cent to 42 per cent in the year just ended. The average contribution also increased. Our goal is for at least one full tuition scholarship, which means that we must have a minimum fund of $50,000. We would like, of course, to provide for multiple scholarships. Since the fund is in memory of a member of our class who contributed much to the affairs of the Institute, we would like to encourage all members of our class to make some contribution during the coming year, and the next one, also. While the 42 per cent participation in the past year is a big improvement over previous years, it falls far short of being a major program for the entire class. So why not, right now, sit down and write a check to the Alumni Fund in memory of the one guy in the class who contributed almost all of his time and effort to the affairs of the Institute." These chaps mean business, and are working at it. And, don't forget, all such gifts are tax deductible. December is the gift month, for most of us, anyway.

I was greatly pleased, at a recent meeting of class officers, to find John Long, Westy Westaway, John Longley, and Max Willard in attendance. You fellows must know that the class elects its own officers, but, the Institute appoints those men who do most of the work, on efforts like the Alumni Fund and its committees and the Educational Council. The meeting was a two-day affair, and was highly informative and enjoyable. We even had one meeting in the brand new skyscraper, the Earth Sciences Building, which is 20 stories high. . . . Now for the press. At a recent dinner in Boston, Ionics was presented the President's "E" award for its outstanding work in "making potable water from high-salinity sources." Dr. **Ed Gilliland,** president of Ionics, accepted the award for his company. Ionics, it appears, has installations all over the world as well as in our own country. This is a very interesting four-page release, and it is unfortunate that space will not allow more detail. More power to Ed. . . . Now comes **Beau Whitton,** Vice-president, with a short story about **George Boys,** whose daughter has just been married to a good friend of Beau's. George, it seems, is in Textiles in Tuxedo, N.C., and has a beautiful home overlooking Lake Summit. George, won't you elaborate just a little? All is well with the Whittons, including good wife, Daphne, who is just now recovering from a successful cataract operation. Beau has a daughter doing graduate work at Brown; a son, a junior at Davidson (N.C.), and another girl, a high school junior. Thanks, Beau, for the news of George Boys, and the personal. I need it.

Did you fellows know that you really have insomnia if you can't sleep after the alarm clock rings? Here's another of those four-page press releases, by the Signode Corporation. Classmate **H. T. Martin** has been made vice-president in charge of purchasing. Martin was formerly vice-president in charge of engineering. . . . From the uranium mining industry comes word that John Sherman, '31, Atomic Industrial Forum, discussed the future of the industry, at a symposium on the state of the western minerals industry. John's paper was entitled "Status of the U.S. Uranium Industry," and was presented to the American Institute of Chemical Engineers in Las Vegas. . . . Dr. **John J. Hanlon,** (M.D.) has recently been appointed health director of the joint Detroit-Wayne County Health Boards—a unique position. John leaves a position as deputy health secretary of Pennsylvania. Good work, John! . . . Here's a short one, about one not short, of brains, that is. It is about our own **Dick Morse,** at present senior lecturer at the Sloan School of Industrial Management, and, chairman of the Cryonetics Corporation, Burlington, Mass. (these names beat me). Dick has now accepted a reappointment

by Secretary Hodges, to the Technical Advisory Board of the Department of Commerce. One wonders what Dick does with the other hand. Great work, Dick, best wishes and don't work yourself into the hospital. . . . I had a rather unexpected phone call the other night (October 1) from **Lou Flanders.** He was just checking up on a letter he sent me several days before that one regarding the Kimball Fund business. Also we discussed several other topics at some length. I reassured him on his questions, and enjoyed hearing from him especially as it was his nickel. . . . It appears that Jim Turner and **Ed Goodridge** have Lou back on the job again as class agent.

This one is a little more general. You fellows must know that your secretary has a card file of addresses of all classmates who ever were, at any time, registered at the Institute under Class of '33, and this includes those who dropped out in the freshman year. This makes the class roll much bigger than most folks know. I receive a few requests for addresses, and would welcome more. Now, these days, everyone is supplied with a zip code number as part of his address, and most of the address changes that come from the Alumni Office have the zip number. Ray Hoffman, Roger Putney, John Sweeney, and Bill Pleasants, have recently changed addresses. How about all of you sending in your zip numbers, so that my file will be complete? And, include a personal story for the notes. . . . Department of fellows from whom I would like to hear; Frank Amadon, Mel Dolan, Dick Warner, Larry DeGive, and whatever happened to **Doc Ford?** Also, is **Al Moeller** still living? With a hatfull of vice-presidents, I hear often from **Cal Mohr,** just heard from Beau Whitton, once in a while from **Ellis Littman.** How about the rest of you officials sending in something? Once again, let me remind the grandmothers that there is a bouquet of flowers coming to the first three from whom I get applications for the club. I find that none of the girls likes to mention age, but most of them are proud of their grandchildren.

I have run out of material at just over four pages of the official paper, and this is not good, as it reminds me of some other classes who never get any more than this. With little material in the way of personals, my style is cramped, to say nothing of my ego. I would like some help. Please send me any suggestions that occur to you on methods of extracting information from the classmates. That's it, for this month. We will try to do better next. It is only October as I write, but when you read this, Christmas greetings will be in order, so, to all of you strong silent men, my best wishes for a Merry Christmas.—**Warren J. Henderson,** Secretary, Fort Rock Farm, Exeter, N.H.

'34

Last month you read **Charlie Parker's** fine account of our 30th Reunion activities in Harwichport on Cape Cod. Considerable time has passed since that memorable occasion, but I wish to get in a few comments concerning the aftermath of our get-together. As you probably know, every line, peg, and plank of the Mayflower II was designed by **William A. Baker** after exhaustive research, principally in England. The ship is moored in Plymouth, Mass., except during the winter months. On the way to Boston from the Cape, Bill and Ruth very graciously offered to stop off at Plymouth and give **Will** and Muriel **Paulsen,** Dorothy and myself a conducted tour of the ship which we accepted with pleasure. It was after normal visiting hours for the public, so we had the Mayflower to ourselves, and saw parts that are not normally seen on a conducted tour. I do not remember details of dimensions, but it is a tiny craft by today's standards, and one wonders how it ever negotiated the Atlantic Ocean, especially during storms. I am sure that I would have changed my way of life if I had to go to the "beakshead" on a stormy night. Today's name, the "head", is reached by going through a small door in the bow of the ship and standing on an open wood lattice type platform, surrounded by the elements. Below decks is no place for a tall person or for those who suffer from claustrophobia. It is impossible to relate here all of the interesting and different ways of life that existed in the 1600's, and therefore I urge all of you who have an opportunity to do so, to visit and tour the Mayflower II at your first opportunity. . . . Bill is also now the curator of the nautical museum at M.I.T., ably assisted by his wife Ruth. They are rooting through all the dusty archives, making order out of chaos, and arranging changes of exhibits of ships and plans, past and present. It is a difficult job to present a well rounded display and some of the needs are for plans, prints, pictures, models and what-have-you, for old boats from the mid-western waterways, such as the Mississippi, Ohio, and Missouri Rivers. If any of you know of, or have, anything along these lines that will assist Bill with his presentations, it will be greatly appreciated. You can get in touch with him at Francis Russell Hart Nautical Museum, M.I.T., Cambridge, Mass. 02139.

C. Sherman Grove, Jr. is the co-author of a technical article on reinforcements, which appeared in Reinforced Plastics magazine, dealing with the filament winding art using glass fiber. Since receiving his M.S. degree at M.I.T., and a Ph.D. from the University of Wisconsin, Sherman has taught chemical engineering at North Carolina State College, Iowa State University, and at Syracuse University, where he is presently director of engineering research. He is also president of Onondaga Associates of Syracuse, N.Y.; is active as a consultant in chemical engineering; and at present is on loan to Baghdad University in Iraq. It sounds like a busy schedule. . . . **Charles W. Jerome** has been named manager of the test and measurement department, Lighting Products Division, Sylvania Electric Products, Inc. Chuck has been with Sylvania since 1946, and has authored several technical papers on color, color analysis, characteristics of phosphors, and on lamps and electroluminescence. . . . Effective last May 15 was the appointment of **Louis P. Holladay, 3d,** as sales manager for metals, chemicals and dry cleaning in the central region for the DuPont Electrochemicals Department. Lou's headquarters are now in Cleveland, Ohio. Prior to his latest appointment he was an industrial engineer at DuPont's Grasselli, N.J., and Niagara Falls, N.Y., plants; he worked on special projects for the government's atomic energy program during World War II; he has held various supervisory positions in the Electrochemicals Department; and has been department control manager since 1952. . . . Since receiving his M.S. degree at M.I.T. in mechanical engineering, **Peter Kalustian** has been with the Drew Chemical Corporation in various capacities including technical counseling. He is a recogognized authority on industrial and edible fats, and has recently been appointed director of special products, Drew Foods Division, United States and Canada. . . . **H. Neal Karr** has been appointed to head the newly created Technical Products Division of the Singer Company, which is responsible for the company's activity in the electronics and instrumentation fields. Neal has been with the Singer organization since 1938, and has been a vice-president of the company since 1954. Congratulations!

As those of you who were lucky enough to be at our 30th Reunion last June may have learned, **John A. Hrones** became the first provost at Case Institute of Technology in Cleveland, Ohio as of July 1. This newly created office combines the former offices of the vice-president for academic affairs and the dean of instruction. Johnny has been vice-president for academic affairs since 1957, and during his tenure in that office Case's academic operations have been strengthened and have grown significantly. Good luck in the future, Johnny, in this important position. . . . **Arthur L. Conn** has been named to a new position of senior consulting engineer in the American Oil Company research and development department. Art has been director of products development and processes, and engineering co-ordinator for the company since 1960. He is now responsible for "acquiring the broadest possible knowledge in the fields of reduced crude processing and hydrocracking," and for familiarity with both industry and company technical aspects. Sounds intriguing, Art. . . . During the 159th commencement of Bowdoin College, Brunswick, Maine, last June the honorary degree of doctor of laws was bestowed upon **John R. Newell.** Johnny has been president of Bath Iron Works Corporation in Bath, Maine, since 1950, at which time he succeeded his father in his position. He also holds honorary degrees from the University of Maine and Stevens Institute of Technology, is a former president of the Bath Board of Aldermen, is an official of the Union Mutual Life Insurance Company and the Federal Reserve Bank of Boston, in addition to activities in many civic and church groups. A full and busy life, Johnny.

As a parting comment I noticed that

our class is sixth in the standings of all classes in the amount of money contributed to the 1964 Alumni Fund. This is a notable achievement and congratulations are due to **Phil Kron** and his associated workers and yourselves. However, only 41 per cent of our class were contributors, which although above the overall average of 34.6 per cent participation of all classes, seems to me to be too small. The 1965 Alumni Fund goal is $1.5 million, and I know that your class representatives will welcome a higher percentage of participation, regardless of the amount that you can afford to give. Let us all try to contribute in 1965! . . . When you read these notes the Christmas season will be close upon us. The season's greetings to all of you, and be sure to let your secretaries hear from you concerning you, yours, and your activities.—**W. Olmstead Wright,** Secretary, 1003 Howard Street, Wheaton, Ill.; Co-Secretaries: **Charles M. Parker,** 3 William Street, Norwalk, Conn.; **Norman B. Krim,** 15 Fox Lane, Newton Center 59, Mass.; **Kendrick H. Lippitt,** 3782 Putter Drive Chula Vista, Calif.

'35

Our letter of the month is from a fellow oarsman of years ago, a terrific resonant baritone in the boat-house showers, **W. Whitney Stueck.** Whit writes as follows from Old Saybrook, Conn.: "I was very pleased to receive your letter although you wouldn't think so by the time it has taken to answer it. Your business fortunes are particularly interesting since I also am starting and developing things. I left the Saybrook Yacht Yard in January 1947, and started my own business, having bought out the machine shop which I started at the yard during the war. We have developed our own line of sheet metal working equipment gradually, having filled in with contract and job work at times. We build hand bending brakes, press brakes and metal cutting band saws. The latter are high speed machines with friction cutting capability for stainless steel and exotic metals. Our growth has been slow the past 10 years, but we have our own lines fairly well established now, and the business shows some signs of stability. It takes a long time, especially in the capital equipment field. I have not sought expansion through outside capital, and this has slowed progress but I do have control of the outfit, even though it is small.

"Your family news was interesting. My mother and father are both living, but Dad is 89 and is confined to bed since he broke a hip about two months ago, but my mother is very well and still able to take care of him with a part-time nurse. I have two boys, 11 months apart. Art is 20 and is in the Air Force, studying electronics and headed for the F106 Interceptor program. He spent one and one-half years at Lehigh but didn't like the overdose of theory, and wanted to do something with his hands. So now he is getting lots more theory but also some practical work, and he loves it. He is a head 'red rope' which means he is a sort of drill master in charge of the complete squadron. We are very pleased with his progress. Our younger son, Bill, is 19 and taller than I am. He is all sports—no mechanical interest whatsoever. He is a sophomore at Springfield College where he is taking education, majoring in history and baseball. He has quite a pitching arm and we are looking forward to the time when he will get a bid from the Yankees, and we can all retire and manage his estate for him.

"I have been away from sailing for a long time but Art and I bought one of my old boats back last year, a Star, and since he went into the service I have been doing a little racing with it. I am pretty rusty, and probably never will get back in the big time but it's fun anyway. Our other interests include mountaineering (in which you had a hand in getting me started), rock climbing, skiing, camping and flying. I use a plane for business (don't own one yet) and have had a private license several years. I am an AMC member, and was very active for a while, but haven't had much time lately. We have had a number of fine trips to Katahdin, and also the White Mountains. I often think of our wintry experience there and wonder that we lived through it. John Westfall drops in now and then. He has a plastics fabrication plant in Rhode Island and a branch in Putnam, Conn. He still skiis a lot. My wife, Phi, has been studying music seriously since the boys can take care of themselves. She has about 50 students on accordion, piano, organ and guitar, and is taking her own lessons in New York and playing with the Accordion Symphony Society there. There is not only never a dull moment around here, but seldom a quiet one either. We live in a very small house which we built after we sold our first house to help finance the business. This was to be a temporary port to weather out the initial blow but businesses have a way of continually needing working capital, so we are still here after 17 years. My mother bought an old house in town, very run down and historical, renovated it gradually and now has one of the showplaces of Old Saybrook. Pop worked with me, until a few years ago when he retired. That about completes the history of the Stueck family. I certainly would like to see you and will try to give you a ring the next time I am up Boston way." Thanks very much for writing such an interesting and newsy letter, Whit. I hope to see you at the 30th if not around here before that. If you, or any others of our classmates, know in advance when you are coming into Boston, pass the word along so we can at least get a few together for lunch while you are here. . . . The finals of the Fourth Annual Golf Tournament are being held at the Weston Golf Club the weekend after this is being written. The finalists are **Ham Dow,** who beat me one up, and **Art Marquardt** whose gross 81 net 66 was three strokes better than last year's champion **Sid Grazi** could come up with. My wife, Doreen, and I spent a lovely weekend with Edith and Ham Dow in Schenectady on a weekend when the autumn colors were at their peak. Three of us played a round at the Edison Club (Edith does not play) and enjoyed a fine match in wonderful weather. Doreen was the official scorekeeper, a job I will have Saturday when Ham and Art play. So next month's notes will tell you who the new champion is.

News from here and there: **Richard F. Bailey** was elected treasurer and assistant secretary of the American Saint Gobain Corporation, a company he has been with since 1956. . . . **Bernard B. Berger** has been named to be director of the new Northeastern Water Laboratory being built in Boston. He has been assistant chief of research for the last two years for the Water Supply and Pollution Control Activities of the Public Health Service. . . . **J. R. Whitney** is regional chairman of the M.I.T. Alumni Fund for the Neenah, Wis., region this year. . . . **L. S. Wiener** is regional chairman for the Teaneck, N. J., region. . . . Dr. **Paul L. Gilmont** has moved again, but not too far from his last address in Los Angeles, to 201 W. Washington Street, Whittier, Calif. . . . **Robert F. Goodman** is now living at 140 Hoyt Street, Stamford, Conn. . . . **Beverly Dudley's** new home is at 5423 Cathedral Avenue, N.W., Washington 16, D.C. . . . **Pete Grant's** home address is R.F.D.#1 Webster, Warner, N.H. . . . **David W. Dale's** new address is R.F.D.#5, Laconia, N.H. . . . **Henry F. King** now resides at 35 Hodder Lane, Framingham, Mass. . . . **Bernie Nelson** can now be reached at the New York Telephone Company, 15 South Fifth Avenue, Mt. Vernon, N.Y. . . . **Bill Stevenson** has moved from Nichols, Conn., to 60 Partridge Lane, Trumbull, Conn. . . . I would enjoy hearing from others of you who have not written since I was elected to this office. And please don't be embarrassed because you have not written before—just write now. If you cannot do that, then put me on your Christmas card list so I can get some news that way, this is your last chance you know. And while I am at it a very Merry Christmas to you and yours. Don't forget to make and keep that New Year's resolution that you will attend the 30th Reunion in June. . . . Note: If you have not already done so, send in your registration immediately for the 30th!—**Allan Q. Mowatt,** Secretary, 61 Beaumont Avenue, Newtonville, 60, Mass.; Regional Secretaries: **Edward C. Edgar,** Kerry Lane, Chappaqua, N.Y.; **Hal L. Bemis,** 510 Avonwood Road, Haverford, Pa.; **Edward J. Collins,** 904 Merchandise Mart, Chicago 54, Ill., and **Gerald C. Rich,** 105 Pasatiempo Drive, Santa Cruz, Calif.

'36

Last month I neglected to report that nine members of the class were on campus for Alumni Day. The list includes Joe Ackerman, Herb Borden, Vince Estabrook, Bill Garth (and Sally), George Parkhurst, the Richard Pattersons, Dorian and Margaret Shainin and Harry Foster accompanied by his wife and daughter. I did not have an opportunity to speak to all of them. . . . Now for the

surprises: Nancy Hughes and **Richard Halloran** annouced their marriage on September 19 at King's Chapel House in Boston. Congratulations are due to Dick from us all and we will be delighted to have an opportunity to meet the bride. . . . A daughter, Carin Leslie, was born on September 14 to Florence and **Ben Cooperstein**. . . . **Al Gray** has returned from Japan and is back home at 83 Winsor Place, Glen Ridge, N.J. His business address is Esso International, Inc., 15 West 51st Street, New York. Al writes, "Kate, Penny (No. 2 daughter) and I left for Japan in July, 1963, and returned in September, 1964. We lived in Kobe where Esso International had an office temporarily set up to supervise the building of three 65,000-dwt tankers. (I left Gibbs and Cox in 1961 after 22 years to join the Tanker Department of Esso.) Despite a pressure-filled work schedule requiring at least six long days per week, the year was very pleasant. We managed to visit most of the interesting spots on Honshu and briefly visited also Hokkaido, Kyushu and Shikoku. The weather was excellent except for July and August which are very warm and humid and the winter was mild, fortunately, but still a bit demanding on the Japanese methods of house heating. Fortunately we took electric blankets with us. . . . We really wanted for nothing except orange juice, which is not available in Japan. I made a serious effort to speak (but not write) the language but unfortunately the effort sort of petered out after 20 lessons because I didn't have time to do any homework. Penny learned more than I did and can even write it a little. I regret that of all the snapshots and slides we took, none records the likeness of my teacher who was very young and pretty. But all Japanese girls are pretty. In June, son John joined us for two months before returning to school in California, and he really had a ball. He is much nearer the proper age bracket for a man to be in to enjoy Japan to the fullest, and is unmarried. We are now back with the rest of our family—No. 1 daughter, son-in-law and two grandchildren—and are very slowly becoming re-acclimated to doing our own house cleaning and cooking and to wearing shoes in the house.

Earlier, I believe I reported that **Bill Greenwood** had joined the S. P. Warner Company of Cumberland Mills, Maine, as manager of graphic arts research. He and his wife Nancy are now living on Black Point Road in Scarborough, where they "overlook the ocean and are convenient to good sailing, yet have room and area for horses also." . . . **Warren Sherburne** writes that although he moved his family to Gales Ferry, Conn. (Box 782, RFD#5), to be nearer his work at Electric Boat in Groton, the relief of weekend commuting was only temporary. Since February he has been design liaison representative for structural design at the Quincy shipyard, but this stint is due to end shortly. . . . Major General **Jack Barclay** (Ret.) is now living at 1801 Covewood Drive, S. E., Huntsville, Ala. He writes that he left the hills of New Jersey and the Lionel Corporation to become manager of the Huntsville Department of the Northrop Space Laboratories early this year. "We are located in Huntsville (the space capitol, Wallace territory) with an engineering staff doing research and analysis work for Marshall Space Flight Center. We are going to help get that man on the moon and back again. The welcome mat is out for any and all visitors!" . . . The sale of Bethlehem's Quincy Yard to General Dynamics meant **Walter Lane**'s transfer to the Sparrows Point Shipyard near Baltimore, where he is living at 924 Dunellen Drive (21204). . . . **Bill Nichols** was also transferred to Sparrows Point and is living in Timonium, Md. 21093. . . . A paper in the Naval Engineers Journal on "The Maritime Administration Surface Effect Ship" was coauthored by **Scott Rethorst.** Scott received his Ph.D. in aeronautics and mathematics from Caltech and founded and is president of Vehicle Research Corporation, "a scientifically based company devising new analytical methods to explore the physics of advanced vehicles and apply the results of this fundamental work in their development." . . . The mailbag this month was heavy, and I did want to share it all with you. There is a long time lag without my withholding news even longer. Season's Greetings to you all. —**Alice H. Kimball,** Secretary, 20 Everett Avenue, Winchester, Mass. 01890.

'37

The Housing and Home Finance Agency of Washington, D.C. announced the Design Awards Panel to judge community facilities design. Names of a five-man advisory committee that will recommend winners among the 266 participants in the 1964 Honor Awards Program in Community Facilities Design have been published. Among them is **Charles A. Blessing** of Detroit, Mich. Author and university lecturer in city planning, Charlie is a member of the American Institute of Architects, and former consultant to the Planning Committee on Housing, National Advisory Committee on Housing for the White House Conference on Aging (1959). He is a former regional planning engineer for the Greater Boston Development Commission and former director of planning for the Chicago Planning Commission. . . . **Daniel J. O'Conor** has been elected executive vice-president of American Cyanamid Company. He has been a vice-president of Cyanamid since 1960 but was elected to the board of directors last March. Dan has been associated with Formica Corporation, a Cyanamid subsidiary since 1940, rising from engineer to president. When Formica was acquired by Cyanamid in 1956 Dan continued as president until 1960 when he was named a Cyanamid vice-president. He has had operational responsibility for Formica and the company's Plastics and Resins and Building Products Division. He makes his home in Morristown, N.J. . . . **Gilbert Mott** represented M.I.T. at the installation of the Very Reverend William C. McInnes, S.J., as sixth president of Fairfield University, Fairfield, Conn.

Professor **Herbert F. Goodwin** of Industrial Management was guest speaker at the banquet when the Maytag Company presented cash awards to 24 supervisors for work simplification ideas. . . . From Automotive News comes the notation that **Arthur M. York** is director of public relations for the U.S. Rubber Company. He has been associated with the firm since 1942. . . . Your secretary received an invitation from **Bernhard Schondorff,** to the 75th anniversary of the Firm Wilhelm Negenscheidt, in Erkelenz, Germany. . . . **John Booton** was recently made manufacturing manager of Standard Toycraft, Avalon Manufacturer Corporation and Advance Color and Crayon Corporation, Brooklyn, N.Y. His wife Catherine has published her new book entitled "Andrew's Wife." . . . From **Charles Gaddi:** "I have recently been re-elected president of the Detroit Council of the American Youth Hostels." . . . **Phil Short** says: "No changes in status. Thanks for the birthday greeting." . . . **Ralph Morrison, Jr.** is now production manager for G. K. Hall Corporation of Boston.—**Robert H. Thorson,** Secretary, 506 Riverside Avenue, Medford, Mass.; **Professor S. Curtis Powell,** Assistant Secretary, Room 5-325, M.I.T., Cambridge, Mass.; **Jerome Salny,** Assistant Secretary, Egbert Hill, Morristown, N.J.

'40

Don't forget to reserve June 12-14, 1965, for our 25th Reunion at the Institute. In the meantime, send your contribution to the Alumni Fund to help swell our 25th Reunion Gift. . . . **Karl Fetters,** President of the American Institute of Mining, Metallurgical and Petroleum Engineers was one of the speakers at the ceremony observing the 100th anniversary of Columbia University's School of Engineering and Applied Science. . . . **Russ Haden,** one time president of our class and formerly vice-president of Dewey and Aly, is now president of Ionics, Inc., developer and manufacturer of electric membrane demineralization plants which are used throughout the world for producing fresh water and treating food products. Ionics also makes electrochemical equipment for fuel cells, life support systems, and industrial chemicals. Russ is also a selectman in Lincoln, Mass. . . . **Jack Danforth** represented the Institute at the inauguration of the Very Reverend John Thomas Corr, C.S.C., as president of Stonehill College on October 16. . . . **Bob Lundgren** is the new assistant manager of purchases and real estate at Detroit Edison. He has been with Detroit Edison since graduation from Tech.

Herb Hollomon, Assistant Secretary of Commerce for Science and Technology, was the guest speaker at the Sheraton Hotel in Philadelphia on October 20. His topic was "National Engineering Policy." . . . One of the problems in writing this column is that frequently there are received advanced notices of speeches at meetings which occur subsequent to the preparation of the column but prior to its receipt by the readers. On rare occasions

there is a possibility that speeches which are reported are not actually given. . . . The response to the questionnaire has indeed been gratifying. The Class of '43 in its 20th Reunion Handbook had a total of 118 responses, or 16.6 per cent of the active class roll. So far, we have had 189 responses, or 22.8 per cent. While the results of the statistics will be found in the Reunion Handbook, there is one interesting note in regard to the political situation. Since the election will be over before this column is read, it is safe to report it, namely, that 174 responses to the questionnaire on political party preference indicated the following: Republican, 93; Democratic, 32; Independent, 31; Liberal 1; Republicans not for Goldwater, 14. The totals for the class of 1943 were: Republican, 62; Democratic, 19; and Independent, 6. . . . Although this is being written during October's bright blue weather, it will be almost Christmas before The Review reaches you. A very Merry Christmas to each and every one of you, and a prosperous New Year.—**Alvin Guttag,** Secretary, Cushman, Darby & Cushman, American Security Building, Washington 5, D.C.; **Samuel A. Goldblith,** Assistant Secretary, Department of Food Technology, M.I.T., Cambridge, Mass.

'41

Dr. **James K. Tyson,** 1217 Woodville Drive, Falls Church, Va., has been named director of the Naval Warfare Analysis Group of the Center for Naval Analyses, Arlington, Va. The Center for Naval Analyses is a private research organization managed by the Franklin Institute, Philadelphia, Pa., and is primarily engaged in cost effectiveness studies to aid the U.S. Navy in determining its requirements for ships, weapons and equipment for 5 to 10 years in the future. Results of the studies aid the Navy in making force-level and budgetary recommendations to the secretary of defense. Prior to his new assignment, Jim headed the Division of Mathematical Sciences and Operations Research in the office of the chief scientist of CNA. From 1942 through 1946 he was on the staff of the Operations Evaluation Group, the nation's first military operations research organization. He returned to this group in 1959, and was on the staff when it became a component of the Center for Naval Analyses in 1962. Between 1946 and 1959 he obtained his Ph.D. in physics at M.I.T., spent several years as a research physicist, conducted operations research at Johns Hopkins University, and was chairman of the Physical Sciences department at the Naval War College, Newport, R.I. He is a member of the American Physical Society, the Operations Research Society of America, and Sigma Xi Fraternity. . . . **Alvin H. Hartman** of Wellesley Hills, Mass., Vice-president of Narragansett Capital Corporation of Providence, R.I., was elected to the executive committee of the National Association of Small Business Investment Companies at its spring meeting held at the Greenbrier, White Sulphur Springs, W. Va. He has been serving on the board of governors of the organization since last December and was recently appointed chairman of the Committee on Management Services. The National Association of Small Business Investment Companies, headquartered in Washington, D.C., is the trade association for SBICs, and it numbers a membership of over 300. It serves as the sounding board of the industry and maintains close liaison with the Small Business Administration, a government regulatory association for SBICs, and also engages in assisting congressmen in developing the legislative background which is the basis for SBIC operation.

Dr. **William P. Cadogan** has been elected corporate vice-president of research of Emhart Corporation. He was director of research of Emhart Manufacturing Company prior to its recent merger with American Hardware Company. He received his Ph.D. in chemical engineering in 1948. Before joining Emhart in 1963, he was manager of the Chemical Development Laboratory at American Machine and Foundry Company in Springdale, Conn. Bill and Mrs. Cadogan and family reside in Simsbury, Conn. . . . **Frank S. Wyle,** President of Wyle Laboratories, Los Angeles, Calif., has recently announced the development of an inexpensive computational system that could have far reaching implications for the individual scientist and engineer. The system combines the Wyle scientific electronic desk calculator with a specially engineered card input device that makes it possible for a frequently used equation or formula to be entered automatically. With this automatic input, scientists and engineers will be able to solve quickly at their desks many problems which now require use of a full-scale computer or prolonged and tedious work with ordinary mechanical calculators and paper and pencil. Frank points out that the solution of problems on a computer requires the help of a professional programmer, translation of the problem into machine language and often hours or even weeks of waiting and set-up time, whereas his system provides an inexpensive computer-like capability that would be completely under the control of the individual. With the card reader, the engineer can punch out frequently used equations on cards which may be kept in a desk file. Then, whenever he needs to use the equation, he simply inserts the card into the machine, and enters the number variables manually on the calculator keyboard. Each step of the problem is visible on a cathode ray tube display, thus reducing the possibility of error, and the answer is produced automatically by the machine. . . . **Robert R. Porter** has been made president of Boss Manufacturer Company of Kewanee, Ill. Since September of 1963 he has been executive vice-president of that company which manufactures work gloves. He was also formerly president of Keasbey and Mattison of Ambler, Pa., a wholly owned American subsidiary of Turner and Newall, Ltd. of Manchester, England. He was graduated from the U.S. Naval Academy in 1932 and received his master of science degree from M.I.T. in 1941. From 1932 to 1947 he served on active duty with the Marine Corps, resigning with the rank of colonel. He is married and has two grown children, Judith Megan of Baltimore, Md., and Robert Jr. of Hartford, Conn. . . . **Robert M. Fano** of M.I.T. made a presentation on multiple access computing at a session on information sciences held at the Statler Hilton in Los Angeles by the Los Angeles and San Francisco Section of the Institute of Electronic and Electrical Engineers. . . . **David P. Herron** has been made manager of the Systems Engineering Department of FMC's Machinery Systems Group.—**Walter J. Kreske,** Secretary, 53 State Street, Boston, Mass.; **Henry Avery,** Assistant Secretary, 169 Mohawk Drive, Pittsburgh, Pa.; **Everett R. Ackerson,** Assistant Secretary, 16 Vernon Street, South Braintree, Mass.

'42

I missed an issue of the class notes last month because when they had to be written I was involved in my move to the Harvard Business School. The difference between Harvard Business School and M.I.T. is striking. It is demonstrated no more clearly than in the change of surroundings. The almost country seclusion of the campus here contrasts vividly with the urban environment of M.I.T. I would be delighted to show any of you around the campus if you would care to visit me here. If you come to Boston, remember you have a standing invitation. . . . As usual the clipping service has been fairly active. I note that **Newman Marsilius** was the Goldwater floor co-ordinator for the New England states at the Republican convention. . . . **Curtis Buford** has been appointed executive vice-president of the Pittsburgh and Lake Erie Railroad Company. Curt has been a vice-president of the Association of American Railroads since 1959. Prior to that he was with the New York Central for many years.

Robert G. Breckenridge, who got his Ph.D. with us, has joined Atomics International which is a division of North American Aviation. He will direct the physics research program. News of another Ph.D. from our class concerns **Charles Davenport;** he has been appointed manager of development in Monsanto Company's Inorganic Chemicals Division after serving as the company's European technical representative in Geneva. . . . **Bob Ely,** one of the M.I.T. Honorary Secretaries, plans to represent the Institute at the inauguration of the second president of the Rockland Community College. . . . The last bit of news is that **Sutton Monro** has been advanced to full professor at Lehigh University. His field is industrial engineering.—**John W. Sheetz, 3d,** Secretary, 45 Rutledge Road, Belmont, Mass.

'44

Since I ended up last month's notes with statistics, I shall start these in a like vein. At the reunion last spring there were 67 fellows; half brought their wives.

Norm Sebell, our Class Agent, gave me some other statistics. He indicated that during the 1963 Alumni Fund year, 47 per cent of our class contributed a total of $13,857. There were 450 contributors, and our percentage of contributors was the highest of all classes but two. . . . Our class has three men who are back at the Institute in various capacities: **Jack Frailey,** XVI, **William Richardson,** X, and **Malcolm Kispert,** XVI. . . . Returning to the vignettes of the reunion, I ran into **Robert Horn,** VI, and his wife Shirley. He is a patent attorney in Boston, and has been very active in some patent work for the Institute. . . . **Pete Matthews,** XV, is at the M.I.T. Instrumentation Lab, and manages to attend some part of every class function in Cambridge. . . . **Tom Cooper,** I, is doing economic studies for the Pennsylvania Railroad, and lives in Wynnewood, Pa. Tom and Marjorie seemed to enjoy the reunion. . . . **Stanley La Valle,** XVI, who is in operations research with Tech Ops, spent the whole weekend in Lenox.

Your Secretary had a long talk with **Bud Bryant,** II, who is in charge of supporting services at Arthur D. Little Company. Bud has continued his interest in athletics, and has just retired from the M.I.T. Athletic Board. He lives in Arlington and commutes to Cambridge. He took over the position after **Jay Martin,** II, left A. D. Little to form his own company for the manufacture of medical electronic instruments. . . . At the reception before the concert, I had a chat with **Egilda Witherell,** VII, who is doing cancer research at the Deaconess Hospital in Boston. She had spent the weekend with her father-in-law and her father who were celebrating their 65th Reunion with the Class of '99. Egilda said that she had recently seen **Anne Lyons Rafferty,** V, who is a practicing chemist and married to a chemist; they live in Marblehead. . . . **Harriet Aldrich Bering,** VII, married a neurosurgeon in Boston, and they live in Brookline. Reports indicate that Harriet still likes to ski. . . . While in the medical profession **Jim Bougas,** VII, is a thoracic surgeon and director of the Cardio-Pulmonary Laboratory at Deaconess Hospital in Boston. . . . **Edwin (Ted) Radford,** VII, is a professor of physiology at Harvard Medical School, and has worked on the presence of Polonium 210 in cigarettes.

The reunion also saw **Roland** and Charlotte **Benjamin,** XV, in Lenox. He was on weekend leave from his church in New Jersey. . . . **John Taft,** XIII, reports that he has been very close to the design of nuclear power plants and their use aboard ships as he is in charge of this activity at the Fore River Shipyard at Fore River, Mass. . . . **John Dawson,** XIII, had come to Lenox with his son John, III, from Louisville, Ky., where John has a lumber drying business. . . . **Peter Rinaldo,** X, and Dorothy were having quite a conversation with **Howard Lockwood,** VIII, and Thelma about overseas accounting services. Pete is vice-president of manufacturing and research of W. R. Grace and Company, Overseas Chemical Division, and Howard has his own CPA practice in Worcester not far from Lenox, Mass. The Lockwoods and their three girls are very active also in outdoor activities, and have spent many of the recent summers climbing the mountains of New Hampshire; the latest one to be climbed was Mount Monadnock. . . . As I indicated in my last month's notes, it was a great reunion, and the Reunion Committee should be very proud of the results of its hard work. The committee consisted of **Scott Carpenter,** who was in charge of the planning when he wasn't tending to business in Europe, Bob Breck, Burt Bromfield, Jack Frailey, Mal Kispert, Bob Peck, and Norm Sebell. Next month I shall try to catch up on the news that has been coming in about activities since the reunion. Seasons best from the Heilmans. —**P. M. Heilman,** Secretary, 30 Ellery Lane, Westport, Conn.

'45

As 1964 draws to a close might I suggest or offer to you the following resolutions for 1956. Resolved that I will support the Alumni Fund activities of my alma mater. Resolved that I will attend my classes' 20th Reunion not only to enrich myself by reassociation with past friends but also to permit my spouse to enjoy a well earned vacation. Resolved that I will faithfully answer my class secretary's never ending appeal for news. With these thoughts well planted in your mind, may we wish one and all a Merry Christmas and a happy 20th Reunion Year.—**C. H. Springer,** Secretary, c/o Firemen's Mutual Insurance Company, 420 Lexington Avenue, New York, N.Y. 10017.

'46

Congratulations are in order for those eager beaver '46ers who are working hard for the Alumni Fund. In the special gifts department **Bill Schield** is area chairman for Wisconsin, and **Norm Sas** is class chairman. In the regular fund solicitation **Ted Henning** is class chairman and the following are regional chairmen: Noel Coe, New Haven, Conn.; Don Burke, St. Petersburg, Fla.; Ted Heuchling, Concord, Mass.; Ed Richardson, Framingham, Mass.; C. S. Lyon, Winchester, Mass.; Sterling Bushnell, Grand Rapids, Mich.; and Bob Spoerl, Portsmouth, N.H. . . . **George A. Whiteside,** an advanced degree associate of our class, has been named vice-president and general manager of the newly formed American-Wiancko Instrumentation Division of Tamar Electronics Industries, Inc., Los Angeles. . . . **Thomas F. Malone,** Director of Research, The Travelers Insurance Co., has been named a member of a special commission on weather modification established by the National Science Foundation. This special commission will prepare an analysis of the present status and potential of weather modification. . . . Harvard University has promoted Dr. **Roger B. Hickler** to assistant professor of medicine. Dr. Hickler is senior associate in medicine at the Peter Bent Brigham Hospital, Boston, and director of the hypertension unit at the hospital—**John A. Maynard,** 25 Pheasant Lane, North Oaks, St. Paul 10, Minn.

'47

We're off to a flying start this year having just attended a very inspiring meeting of alumni officers and others active in fund raising or educational affairs. I met **Art Schwartz** who traveled all the way from Beverly Hills, Calif., to attend the two-day meeting. Other members of '47 who attended were Reynold Grammer, Jr., Warren J. Himmelberger, Edward Kane, Richard Mooney, Edward Peacock, Horace Robson, William Seifert and Mary Wagley. . . . **Mrs. Philip Wagley,** Course V, from Baltimore told me that she taught chemistry at Smith before raising a family. She has three children and her husband is on the academic staff at Johns Hopkins University. One of the highlights of the meeting was a preview of the lecture hall in the new Earth Sciences Building. Everything is now operated with push buttons for raising and lowering projection screens, blackboards and even the angle of the venetian blind slats to darken or lighten the room. We had a chance to see everything demonstrated prior to debugging and it's nothing like good old 10-250. Several class secretaries with whom I chatted complained of the lack of communication from alumni. One of the suggestions was to send a note to alumni after we receive address changes from the Institute. In this way we might learn something about job changes, transfers, etc. How about breaking the silence barrier and sending me some information about your most recent escapades?

Some recent news releases received. **Arnold M. Varner** has been appointed director of research at Whitin Machine Works. After receiving his degree in chemical engineering he worked for Pure Oil Company, General Electric Company, Chicago Molded Products Company and Standard Packaging Corporation, where he was technical director. . . . **Harris M. Carter** has been appointed assistant to the president of the Ortho Division, California Chemical Company.

The following address changes have been received during the summer months. **George W. Smith, Jr.,** Industrial Products Division, Westinghouse Air Brake Company, 1953 Mercer Road, Lexington, Ky.; Colonel **William L. Starnes,** 205 North AIA, Patrick AFB, Fla.; **John E. Taft,** 16 Moore Road, Sudbury, Mass.; **William W. Wallis,** 501 Rencher Street, Clovis, N.M.; **Stanley K. Weissberg,** 3649 Green Vista Drive, Encino, Calif.; **Eugene E. Wejman,** 6479 Upper Parkway North, Wauwatosa, Wis.; **John T. Wells,** 408 Opal Cove Way, Seal Beach, Calif.; **Carl H. Haushalter,** 6825 Gowanda State Road, Hamburg, N.Y.; **Walter Kisluk,** 24 Grimes Road, Old Greenwich, Conn.; Colonel **Joseph R. Myers,** 5368 Sage Avenue, Edwards AFB, Calif.; **James H. Rial, Jr.,** 2420 Lawndale, Evanston, Ill.; **Walter Rotman,** 17 Gerald Road, Brighton, Mass.; **Robert L. Seidler,** 356 Mountain Avenue, Summit, New Jer-

sey; **Melvin O. Simpson,** Combine Enterprise, Ltd., 48 St. Clair Avenue, Toronto, Ontario; **Robert L. Bryant,** 828 W. Houston Street, Sherman, Texas; **Barbara S. Sokoloff,** 6310 East Halbert Road, Bethesda, Md.; **Arthur G. Ashbrook, Jr.,** 2925 39th Street, N.W., Washington, D.C.; **William H. Baker,** 9106 Ambleside Drive, Mentor, Ohio; **Frederick A. Bierhoff,** 153 Seacord Road, New Rochelle, N.Y.; **David D. Brillembourg,** Avenida Principal Lomas, El Mirador, Caracas, Venezuela; **Steffen F. Dieckmann,** 318 Spalding Road, Wilmington, Del.; Dr. **Wilfred L. Freyberger,** 200 Agate Street, Houghton, Mich.; **Elroy E. Frye,** 11414 Wendover, Houston, Texas; **Louis Gold,** Martin Company, Research Institute for Advanced Studies, Baltimore, Md.; **Lucian J. Hunt,** 1714 E. 30th Street, Tulsa, Okla.; **John D. Ireland,** 54 Bon Air Avenue, New Rochelle, N.Y.; **Albin D. Kazanowski,** 22716 Kittridge Street, Canoga Park, Calif.; **Vincent P. Rossiter,** Department of Trade and Commerce, Engineering and Equipment Division, Wellington Street, Ottawa, Ontario; **Arthur Schwartz,** 144 South Camden Avenue, Beverly Hills, Calif.; Captain **Robert J. Slagle,** 2140 West Baldwin Road, Palatine, Ill.; **Edward M. Townsend,** P.O. Box 372, Holmdal, N.J.; **James G. Ulmer,** 3729 Del Monte Drive, Houston, Texas; **William E. Walk, Jr.,** 2830 Kapiolani Boulevard, Honolulu, Hawaii; Lieutenant Colonel **John R. Walker,** 30th Artillery Brigade, San Francisco, Calif.; **John W. Kellett,** 420 E. 55th Street, New York, N.Y.; **Norman B. King,** 230 Old Connecticut Path, Wayland, Mass.; Mrs. **Phyllis M. Machta,** 6601 Brigadoon Drive, Bethesda, Md.; **Leslie C. Merrill,** 16474 Espola Road, Poway, Calif.; **Harvey S. Miller,** 63 Maplewood Avenue, Newton Center, Mass.; **Emory A. Ploen,** Ruggles Street, Westboro, Mass.; Lieutenant Colonel **John F. P. Zengel,** 2991 Wendell Way, Riverside, Calif.; **James T. VanMeter,** 5520 Chantrey Road, Edina, Minn.; **Allen N. Sweeny,** 63 Cambridge Road, Grosse Pointe, Mich.

Also, **John G. Sutton, Jr.,** 3045 Alta Laguna Boulevard, Laguna Beach, Calif.; **Kenneth E. Schreiner,** 13130 Cumberland Drive, Saratoga, Calif.; **Hayden N. Ringer,** 161 McKnight Drive, Laguna Beach, Calif.; **Wallace C. Philoon, Jr.,** Department of Chemical Engineering, University of Tulsa, 600 S. College Street, Tulsa 4, Okla.; **Carl O. Mattinson,** 3610 Grant Avenue, Ogden, Utah; **Robert G. Mercley,** Norman Bridge Lab, California Institute of Technology, Pasadena, Calif.; Captain **Lewis E. Larson, Jr.,** 19 Everett Avenue, Winchester, Mass.; Professor **Norman N. Holland, Jr.,** Room 14N-416, M.I.T., Cambridge, Mass.; **William W. Happ,** Dept. de Electronica, Lab de Semiconductores, Fac de Ingenieria Paseo Colon, Buenos Aires, Argentina; **Louis Gold,** RIAS, 7212 Bellona Avenue, Baltimore, Md.; Lieutenant Colonel **Robert I. Dice,** Commonwealth Association, Inc., 209 E. Washington Avenue, Jackson, Mich.; **Robert W. Devine, Jr.,** 88 Morningside Drive, New York, N.Y.; **Thomas P. Cheatham, Jr.,** 520 E. Boulevard Drive, Alexandria, Va.; **Donald E. Boynton,** 200 North Belair, Cumberland, Md.; **Frank W. Barry,** 23 Diana Lane, Windsor, Conn.; **John P. Wentworth,** American Consulate General, P.O. Box 2895, Salisbury, Rhodesia, Africa; **Marvin W. Sweeney, Jr.,** 17971 East Allegheny Drive, Santa Ana, Calif.; **Vernon J. Sholund,** 1734 North Kings Highway, Clearwater, Fla.; Professor **Joseph F. Krebs,** 53 Anthony Circle, Newtonville, Mass.; **Donald W. Kornreich,** 3028 Traymore Lane, Bowie, Md.; **Raymond Kaplan,** 446 Warwick Ave., Teaneck, N.J., Lieutenant Commander **Francis P. Cuccias,** Commander Fleet Air Wing Number 14, FPO, San Francisco, Calif.; **Charles F. Brodersen,** 493 Townsend, Birmingham, Mich.; and **Malcolm A. Bird,** Apt. 10, 443 Westover Hills Boulevard, Richmond Va.—**Martin M. Phillips,** Secretary, Vestar, Inc., Hickory Drive, Waltham, Mass.

'48

As many of you know, the Institute holds biennially an Alumni Officers' Conference for the benefit of educational counselors, class and club officers as well as the Alumni Council. The fifth such conference was held at the Institute on September 10, 11 and 12, and it may interest you to know that our class had the largest number in attendance of any class present. Those attending were Bill Bangser, Hal Beumer, Marty Billett, Don Blickwede, Bob Bliss, Carl Boll, Ken Brock, Art Brusila, Tom Folger, Ed Hanley, Ben Kessel, Norm Kreisman, Den McNear, George Oberbeck, John Reid, Pete Richardson, Verity Smith, Dick Snow, Graham Sterling and Jack Walch. This was undoubtedly the largest Alumni Officers' Conference that has ever been held with a total attendance of over 400. . . . Directors of Chemical Products Corporation, East Providence, R.I., have named **George Fountas, X,** vice-president in charge of research. His firm manufactures a large product line of vinyl dispersions, under the general trade name "Chem-o-sol," while the Chemotype Division makes a revolutionary new printing plate from one of the company's Chem-o-sol compounds. George has been with Chemical Products for 15 years, serving first as a development chemist, and later as a group leader in the Lacquer Division. He has been chief chemist since 1958. . . . Now that **Clark DuBois, II,** has been named assistant chief engineer for postage metering machines and scales at Pitney-Bowes, Inc., perhaps we ought to join him in a campaign to "Stamp Out Stamps—Use Metered Mail." Formerly chief engineer for the Instrument Division of Manning, Maxwell & Moore, Clark joined Pitney-Bowes in 1963 as a senior engineer. He lives in Fairfield, Conn., with his wife, Connie, and their two children. . . . Three technical organizations at General Electric Company's Computer Department in Phoenix have merged to form a new design and development operation under **John Weil, XV.** He is now manager of the new Systems and Processors Operation and will be responsible for design, development and engineering of all electronic data processors and data communications equipment, as well as soft-ware or programming packages for this equipment. He joined G.E. in 1953 after receiving his doctorate in experimental physics from Cornell and was first assigned to Knoll Atomic Power Laboratory. Two years later he was transferred to the Vallecitos Atomic Laboratory and thence to the Dresden Station in 1960. Then, in May, 1963, he was transferred to the Computer Department at Phoenix as manager of special projects. Author and co-author of some 20 technical papers and publications, John is listed both in "Who's Who in Atoms" and in "American Men of Science." . . . Last June, Major General **John Thorlin, II,** S.M., commanding general of White Sands Missile Range, N.M., received an honorary doctor of laws degree during the 71st annual commencement of New Mexico State University. The citation stated: "For outstanding achievements as administrator, educator and research director for the United States Army, resourceful and efficient leadership in the management of ordnance equipment, superior organizational ability in directing major operations in the missile and space program, and a distinguished career as a soldier, spanning nearly 31 years." A graduate of West Point as well as Tech, he has been commanding general at White Sands since 1962. Formerly, he headed the Ordnance Board, the Ordnance Training Command (including the Guided Missile School) at Huntsville, Ala., the Ordnance School at Aberdeen, Md., and was commanding general of the Ordnance Tank-Automotive Command in Detroit.

Al Bryan, I, S.M., has been named operations manager of a new Raytheon Company operation in Huntsville, Ala., which will supplement Raytheon's existing ties with the Army Missile Command and NASA's Marshall Space Flight Center. The firm's present corporate regional marketing office at Huntsville will also report to him. Al has held several top engineering and management positions since joining Raytheon in 1959. His most recent was director of program development at the Space and Information Systems Division. Previously, 1952 to 1958, he served as chief of Army Rocket and Guided Missile Agency's projects staff at Redstone Arsenal and in late 1958 was assigned as chief of research and engineering at ARGMA. A lieutenant colonel in the U.S. Army Reserve, Al took his undergraduate degree at Tennessee Polytechnic Institute. . . . Among recent promotions in the Eastern Chemical Division of Hooker Chemical Corporation was that of **Dick Krueger, X,** who was named production superintendent at Niagara. Dick joined Hooker at Niagara in 1949 as a chemical engineer in process study where he was later promoted to group leader. In 1953 he was named technical foreman in the caustic (sodium sulfide) department and later, 1956, was assigned to the fine chemicals department, first as technical foreman, then as department head, the post he has held since 1957. He and his family live at 2 Colony Court, Amherst, N.Y. . . . **Al Kelley, VI,** S.B.,

XVI, Sc.D., has been named deputy director of the NASA electronic research center to be established soon in the Greater Boston area. Presently director of electronics and control division of NASA's Office of Advanced Research and Technology, Al is a Navy commander on detached duty with the space agency which he joined in 1960. A graduate of Annapolis in 1945, he was a carrier pilot during the Korean conflict and was also an experimental test pilot. . . . The U.S. Military Academy at West Point recently announced that **Bob Day,** X-A S.M., has been promoted to the rank of colonel. Presently on sabbatical leave at Stanford University, Bob holds the post of director of admissions and registrar at West Point. He received his first B.S. degree from the University of Illinois in 1941 and another upon graduation from West Point in 1944. He and his wife Marjory are presently residing in Stanford, Calif. . . . **Norm Kreisman,** XV and IX-B, represented the Institute at the inauguration of Albert H. Bowker as chancellor of the City University of New York on November 5.

In recent years, industry has been focusing more and more on the importance of good two-way communication. Among those who are doing research in this area is **Alex Bavelas** (GP Ph.D.) who is now a professor at Tech and has conducted various experiments in this area for Bell Laboratories. Before joining the faculty of the Institute, Alex was at Stanford as a professor of psychology. . . . Your scribe was pleased indeed to see **Bob Ormiston,** VI, at the September 24 meeting of the M.I.T. Club of Northern New Jersey. Formerly assistant to the department general manager of AT & T in Cincinnati, Bob has been transferred back East and is now operating out of the firm's headquarters in New York. He and his family are now residing at 163 Cottage Road, Wyckoff, N.J. . . . As our predecessors have harped in the past, the writing of class notes can be the easiest thing in the world if we have the material with which to work. However, for being the largest class at the Institute, we seem to be the poorest group of letter writers so please each of you sit down and drop a line to the secretary nearest you. Better yet, give us a call on the phone whenever you are in the area so we can have a chat or even get together for a visit. May the joys of this Christmas season be with you and yours throughout the coming year, and as the strains of "Auld Lang Syne" bring nostalgia to your heart on New Year's Eve, may you resolve to think of your old classmates and write us a letter soon.—**John T. Reid,** Assistant Secretary, 80 Renshaw Avenue, East Orange, N.J.; **Robert H. Mott,** Secretary, Kent School, Kent, Conn. 06757; **Richard V. Baum,** Assistant Secretary, 1718 East Rancho Drive, Phoenix, Ariz.

'49

Mary (Cretella) Lavine spoke before the American Institute of Metallurgical and Petroleum Engineers in Boston on the subject of "Metallurgical Aspects of GaAs-Ge Heterojunctions" last August 31. The occasion was a technical conference on solid-solid interfaces which are of considerable interest in the field of solid state electronics. Our hats are respectfully doffed to Mary for being so knowledgeable in such an important field. She's the mother of three children and lives with her husband, Jerome, in Lincoln, Mass. . . . **Bert Chope** has been named winner of the Distinguished Achievement Award of Pi Kappa Alpha Fraternity. This award, presented annually since 1936, is recognition by the fraternity of one of its members who has attained national prominence through notable achievement in his chosen field of endeavor. Bert is president of Industrial Nucleonics Corporation of Columbus, Ohio, and the award was made for his contribution to industrial progress as founder and chief executive of his firm as well as for outstanding service to his community. In taking his place among previous winners of the fraternity's Distinguished Achievement Award, Bert joins many men of national prominence such as last year's winner, Dr. Luther Terry, Surgeon General of the United States. Those who attended the 15th Reunion will remember Bert's generosity in providing photographic coverage of the affair. We look forward with pleasure to seeing the movies and stills which were taken by his crew.

Dave Hardin, Willmette, Ill., has been named chairman of the Chicago Business Industrial Project's new board of directors. The project meets the needs of urbanization through seminars, luncheons, and publications directed at the business and industrial community. Dave is president of Market Facts, Inc., a business marketing research association. . . . Thanks to the questionnaires which the 15th Reunion registrants filled out, your secretary has a wealth of information to draw on for this column. I will pick a few names at random from the pile each month and keep going until the pile is no more. . . . **Jack Barriger** (our new class vice-president) is traffic manager for the Santa Fe Railroad and he got a prize for the dubious distinction of having fired more people than anyone else at the reunion. This isn't as dubious as it sounds when you learn that Jack has cognizance over some 2,500 employees. He has also hired more than anyone else (500 hires, 50 fires). He has had six jobs and moved six times since graduating, hasn't gained or lost an ounce, has visited 10 countries, travels 25,000 to 50,000 miles in a year, and likes skiing, sailing, hiking, and scuba diving. He looks it! . . . **Eliot Buckingham** is president of Buckingham Associates, Inc. (gear consultants) in Springfield, Vt. He carries on the work of his father, who was a professor at M.I.T. and one of the world's greatest authorities on gears. Buck has four children and we were pleased that he brought his family to the reunion. He has had seven jobs and moved five times since graduation, has gained 20 pounds and likes music and carpentry. . . . **Ira Dyer** is vice-president of Bolt, Beranek, and Newman in Cambridge, Mass. He has two children, moved once since graduation, had nine jobs, gained ten pounds, keeps up in his field by striving with might and main (that's not how he put it), lists no hobbies, and can do 10 push-ups if pushed.—**Fletcher Eaton,** Secretary, 42 Perry Drive, Needham, Mass. 02192.

'50

What's new? That's what I would like to know from you, so please write me today. Meanwhile I hear that. **Enders Robinson** is a deputy professor in Uppsala University, Sweden, and is a consultant to the Pan American Petroleum Corporation in Tulsa, Okla. Previously, he was director of the M.I.T. Geophysical Analysis Group, and has been with Gulf, Standard Oil Company (N.J.), Michigan State University, and the University of Wisconsin. His main interests are in the application of statistical communication theory to geophysics. . . . **John Dockum, Jr.** has been appointed plastics sales manager of Pennsalt Chemicals Corporation. He is responsible for the national sales of Pennsalt's Kynar and Tetran fluorocarbon plastics. He lives in Chadds Ford, Pa., with his wife and three children. . . . Since 1950, **Paul James** has been active in the field of digital computer programing techniques, ultrasonic delay lines, effects of weather on radar propagation and Doppler radar systems analysis. He is now working at the Laboratory for Electronics in Boston, Mass.

John Wylie has been promoted to associate engineer in Socony Mobil Oil Company's engineering department. He previously was with S. B. Penick and Company and received his M.S. degree in industrial engineering from Columbia after leaving Tech. He lives at 212 Ryder Road, Manhasset, N.Y. . . . **Floyd Wideman, Jr.** has been named president of Pharmedica Laboratories, a new division of Johnson & Johnson. He is also vice-president for new products and a member of the J & J management board. He joined J & J in 1955 as an assistant product director and was promoted to director of new products in 1957. Floyd lives on Navesink River Road, Locust, N.J. Best regards and Merry Christmas to all. —**Gabriel N. Stilian,** Secretary, 4 Biscayne Drive, Huntington, N.Y.

'53

Received an interesting letter from **Janet (Zacks) Grosser,** V and II, who reports that she is kept busy with her son, Adam, and is looking forward to going back to work—this time teaching rather than engineering. The other man in Janet's life, **Mort,** IX and II, is currently director of publications for the Boeing Scientific Research Laboratories in Seattle. Mort was a Stegner Creative Writing Fellow at Stanford where he spent full time writing fiction. His writings for the New Yorker, and history of science journals, as well as an excellent book, "The Discovery of Neptune," certainly prove

the value of a "liberal" education. Keep up the good work, Mort! . . . **Tom Faulhaber,** XVII, has also taken to the printed word with an excellent and much quoted article entitled "Planning Industrial Facilities For Today—And Tomorrow." Tom was awarded the Daniel W. Mead prize of the American Society of Civil Engineers in 1963 and is currently a partner in the consulting engineering firm, Ganteaume and McMullen, in Boston. Tom quotes Keynes as pointing out that: "The engine which drives enterprise is not thrift, but profit." In this light, your Secretary would like to recommend a recently published book which he found very stimulating. The book is entitled "Managing for Results," and was written by Peter F. Drucker. . . . Here in Cambridge, our class will be pleased to learn that **Vince Fulmer,** XIV, has been appointed as vice-president and secretary of the Institute. He will also serve as executive officer of the development committee of the M.I.T. Corporation.

Allan S. Hoffman, X, was recently named associate director of research of Amicon Corporation in Cambridge and has established a wide reputation in the field of high polymers. Allan, after receiving a Sc.D. from Tech, spent time teaching here and at the University of California, and as Fulbright Fellow in Paris. Ah, to be a student in Paris, again! . . . Speaking of traveling and studying abroad, **J. Robert Schrieffer,** VIII, after receiving a doctorate at the University of Illinois, was a NSF fellow at the University of Birmingham and at the Niels Bohr Institute in Copenhagen. Bob was a visiting professor at the University of Geneva, and was recently named Mary Amanda Wood Professor of Physics at the University of Pennsylvania. Bob has contributed to the theory of superconductivity. . . . **Richard E. Segien,** II, has recently been promoted to special assistant to the chief engineer of Boston Gas Company's Engineering Department. Dick is also active in the Greater Boston Chamber of Commerce Practical Politics Program. . . . The New York Times carried an interesting feature on the new generation of executives that are emerging in the garment industry. The story included a discussion on **Jean-Pierre Radley,** XV and VI, who as son of the famed designer, Pauline Trigere, has a natural entry to this business. Jean-Pierre made a significant contribution to the field by developing a perpetual inventory system for piece goods. Maybe we can arrange with our man on 7th Avenue to standardize a little—one model change every five years to coincide with our reunions, of course! Send letters.—**Norman R. Gardner,** Secretary, 100 Memorial Drive, Cambridge, Mass.

'54

The leaves and a rake await me outside, but this is our holiday issue, so to you all, Chuck and I send a wish for a Merry Christmas and, of course, a happy New Year. Several of you were kind enough to write concerning your own activities or to pass along letters and information you had received from others. It is a practice that deserves encouragement, especially since so many of you will have lots of notes from Christmas and holiday cards. . . . **George Perry,** who received his first degree with our class and later a Ph.D. in economics, was in Cambridge for a few weeks in connection with a research project. George, his wife, and their three children are back in Minneapolis where he is an assistant professor of economics at the University of Minnesota. They had been in Washington where George spent two years with the President's Council of Economic Advisers. He was responsible for Gross National Product Projections during the second year. . . . Among those of our class who have more than the median number of children is **Jim Hazard.** He and his wife, the former Ann Darin whom he married in 1956, have four children, girls ages 4 and 7 and boys ages 6, and 8 weeks. Jim spent the summer in Sunapee, N.H. When August came, it was back to work for the Scott Paper Company. In addition to Scott, Jim has worked with Elliot Industries, Associated Designers, and the Industrial Education Institute. . . . A sales representative for the Worthington Air Conditioning Company in New York City visited Massachusetts in June. It was **Dan Kokiel** who, with his wife, was here to attend the reunion. (Perhaps it is well he didn't come during our cool August.)

Several classmates attended a recent Alumni Officers' Conference. One was **Dick Finn,** who heads up the Industrial Liaison Office here at M.I.T. Another was **Dick Lane,** who is an attorney in Washington and as one might suppose quite wound up in politics. Before Washington, Dick had practiced briefly in Brazil and for a much longer period in Paris. . . . **Dick Hayes** could not make it to the reunion, but he may be in Cambridge in a more permanent way, for he is associated with the new NASA center which is to be located in Cambridge. Dick said that he and Ellin had not yet (June) decided to actually come North when the unit moves here, but for one who reports that Houston was too hot for him, the cool New England climate would seem just right. Dick has been adding degrees and now has a master's in business administration from George Washington University. . . . **Fred Zappala** is no longer with Raytheon. The report is that he is working on PERT systems for Management Sciences Corporation in Harvard Square. . . . A recent newspaper article reports that the moon is getting smaller because it is loosing moon dust. If one of our own has anything to do with it, as the moon gets smaller there, it will get larger on earth. This would be done by using a rocket probe to collect moon dust. Such a collection system is the responsibility of **Sam Loch** and his employer, Electro Optical Systems, a wholly owned subsidiary of Xerox.

Recently, because of some incidents in New York City, newspaper editorials have been written and sermons preached on the topic of our lack of concern for our fellow citizens. It is, therefore, unfortunate that similar attention has not been given to the heroic efforts of **Walter Kroy** who with a friend rescued Velma Oleska in Los Angeles. Walter was visiting with a friend when they heard firecracker-like noises and then a woman moaning. Upon investigation they discovered that Miss Oleska had been shot twice and was being pistol whipped by a man police later identified as the woman's former suitor. The two men grabbed the attacker and held him until police arrived. . . . From the graduates: Among the authors of a paper on coherent detection systems which was published by I.E.E.E. was **Paul R. Drouilhet, Jr.** Paul is with the Lincoln Laboratory of M.I.T. in Lexington.

Our classmate **Ernest N. Poulos** added an M.S. in engineering administration to the S.B. and S.M. which he earned from M.I.T. This June's degree is from Case Institute of Technology. . . . From the Townsman in Wellesley we learned that **John B. Rogers** was selected as one of the eight winners in the New England regional architectural competition sponsored by the Boston Arts Festival. This year's winner was a hilltop summer residence for Thomas Perry located in Stockbridge. Mr. Perry is the business manager for the Boston Symphony Orchestra. The house was designed primarily for the period when the orchestra is at Tanglewood and is built of exposed wood construction in the shape of a chambered nautilus to allow full view of the surroundings. This is the second Boston Festival award John has won. In 1961 before he left Perry, Shaw, Hepburn, and Dean and entered private practice, he received a similar award for a summer house in Chatham.—**Robert Evans, Jr.,** Secretary, 43 High Street, South Acton.

'55

Classmates have been making news in the academic world often recently, both as students and teachers. **Francis J. Bonner** received a doctorate in chemical engineering from the University of Delaware in June, in absentia since by then he had arrived in Uppsala, Sweden, to pursue postdoctoral research there. At Delaware Frank's research on the oxidization of nickel steels, performed under a fellowship provided by the International Nickel Company, involved the use of an electron probe X-ray microanalyzer. His present research, under a Swedish Government Fellowship awarded through the Swedish-American Foundation, is in thermal diffusion in macromolecular solutions. Frank extends an invitation to visit to classmates who might be near Uppsala and says he would welcome a chance to get in touch with others in Europe. Address him at the Institute of Physical Chemistry, Uppsala University, Uppsala, Sweden. . . . In June Lieutenant Colonel **Richard Wagner** graduated from the course at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, designed to prepare selected officers for duty as commanders and general staff officers at di-

vision, corps, and field army levels. . . . Major **Charles Wurster** and Dorothy left Los Angeles this summer for the Air Force Academy, where Charles is now a mathematics instructor. Before leaving the Space Systems Division, Charles was one of those receiving special recognition from Air Force Secretary Zuckert as part of the observance this year of the 10th anniversary of Air Force missile and space progress. . . . **Anthony Gaudy** has presented papers this year on water pollution and its control at conferences in Florida and Tokyo. After several years in industry as an industrial wastes engineer and at the University of Illinois as an assistant professor of sanitary engineering, he became a professor of civil engineering at Oklahoma State University. In addition he is presently serving a three-year term as national director of the Oklahoma Water Pollution and Control Federation.

Lionel Baldwin has been appointed acting dean of the College of Engineering of Colorado State University. An associate professor of civil engineering at Colorado State since 1961, he did aeronautical research previously during service in the Air Force and subsequently as a civilian for NASA and its predecessor. . . . **Kurt Gottfried** has been appointed professor of physics at the University of Illinois. Since leaving M.I.T. he has done research at the Institute for Theoretical Physics in Copenhagen and served for the past four years as assistant professor at Harvard. . . . A few non-academic promotions and assignments are likewise newsworthy. **Edward Gore** is now market planning manager in the processing systems department at IBM in Endicott, N.Y. Ed, who received a master's degree in business from Columbia in 1958, lives in Endwell. . . . **Fred Brecher** is now an associate of David Bloom, Inc., consulting structural engineers, in Philadelphia. . . . **John Lincoln** has joined Monsanto as a senior chemical engineer at its Springfield, Mass., plant. . . . **Leo Rowe** is now section head of polyester development for Chemstrand in Decatur, Ala. . . . **Lawrence Hoagland** has been re-elected director and vice-president of Dynatech in Cambridge. . . . Finally **Ernst Schloeman** has been recognized for outstanding achievement in the Research Division of Raytheon by his promotion to the rank of scientific fellow; his investigations of the microwave properties of magnetic materials have been his primary interest. Our best wishes to all of you for the new year, and let us invite you to bring us up to date on your activities in the decade since we left M.I.T.!—Co-secretaries: Mrs. **J. H. Venarde (Dell Lanier),** 2401 Brae Road, Wilmington, Del. 19803; **L. Dennis Shapiro,** Aerospace Research, Inc., 130 Lincoln Street, Boston, Mass. 02135.

'56

I am sad to have to report the death of another classmate, **Robert D. Brown,** of an illness on September 16, 1964. Bob was married to the former Elizabeth Gehlhaus and was working at the **M.I.T.** Instrumentation Laboratory. . . . **Herb Amster** and family have moved to Ann Arbor, Mich., where he is working in market research for Ford Motor. . . . **Paul Brown** is now with the Center for Advanced Engineering Study at Tech. . . . **Bob d'Attilio** recently wrote an article on information theory for I.E.E.E. Transactions. . . . Another author is **Ted Korelitz** whose writing appeared in Hydrocarbon Processing and Petroleum Refiner. Ted supervises computer operations and programing for the Badger Company in Cambridge. . . . **Emmanuel Papadakis** is working for the Ultrasonic Device Development Group at Bell Labs in Allentown, Pa. His speciality is wave propagation in steel and crystals. . . . As of this month **Guy Spencer** has returned to Boston to work for the Alumni Association and the Alumni Fund. . . . **Wolf Vieth** has returned from two years heading the chemical engineering practice station at American Cyanamid to be an assistant professor at Tech. Wolf lives in Lexington with his wife and two daughters. . . . More news on the 10th Reunion. The date is now set for June 10-12, 1966, at the Wychmere Harbors Club. Those interested in working on the planning and operating staff please contact **Bill Grinker,** 21 Woodward Road, Framingham, Mass., or **Micky Reiss,** 20 Peterson Road, Natick, Mass. From your Secretary, a Merry Christmas to all.—**Bruce B. Bredehoft,** Secretary, 16 Millbrook Road, Westwood, Mass.

'57

Since writing last month's notes I've sent out over twenty-five postcards to class members pleading for information for this month's column. To date I've received no replies. I can't fabricate the news; please help me out. In the meantime here is an unsolicited letter from **Ed Schuman:** "Just a short note to let you know that our second child was born last April 20th (Eric Michael) and that his sister, Jennifer, is very pleased with her brother. Toni (nee Deutsch, '58) is doing remarkably well as a mother considering that Course II is hardly ideal preparation for home economics. I'm still at Litton worrying about the complexities of TFX financing and administration and enjoying the many pleasures of Southern California, which include skiing (soon, we hope), sailing and the best wines. Boston seems very far away. I've been quite active on the M.I.T. Educational Council for this area and find it stimulating and rewarding. The high school seniors today are so much better prepared, more poised, and brighter than we ever were that it frightens me. But at least we don't have to worry about the future." That's all. If you want to see more news, you'll have to contribute. Possibly you would like to put me on your Christmas card list and enclose a note. Concerning reunion plans: the report will be included in the next month's issue.—**Frederick L. Morefield,** Secretary, 1A Acorn Street, Boston 8, Mass.

'59

This month I take pleasure in saluting our classmates who received advanced degrees during the summer. It is indeed pleasing that so many have gone on to further their development in the academic world; in June and September of this year alone, M.I.T. awarded 25 doctorates to '59ers and eight to our graduate students. Ph.D. degrees from the Institute were awarded to William Beres, Richard Briggs, Joseph Burgiel, Stephen Denker, David Garelick, George Glass, Leon Glicksman, Bruce Hartenbaum, Hsien Hsieh, Berton Lapidus, Marvin Manheim, William May, Robert Noble, Edwin Rossow, Peter Scop, Gerard Stephenson, James Turner, John vanRaalte, Lawrence Vaughan, and Samuel Wilensky, while Doctor of Sciences were received by John Christie, James Conklin, John Henry, Charles Hill, and Alan Oppenheim. Master's degrees went to Damon Cummings, Edward Haines, William Putt, Frederick Shinnick, and Roger Travis. . . . Graduate students receiving doctorates from M.I.T. were Neal Brown, Richard Jaffe, Robert Kelly, Peter Lim, Ulrich Luscher, Glen Miles, Philip Mullan, and John Stackpole. . . . At other schools, **Ian Irons** received his M.D. from Western Reserve, a California Technology Ph.D. was awarded to **Charles Harper, Malcolm Chase** received an M.S. from Vermont and **Richard Talbot** graduated with an M.S. from A.F.I.T. Congratulations to all of them, and best of luck (or shall we say "skill") with careers. I suspect that there are others who received degrees from other schools; if so, I sincerely regret that they were not credited, but I must rely upon outside sources for information coming from beyond the hallowed halls of M.I.T. Let me hear about those degrees.

Further plaudits are due our class for the contribution to the Alumni Fund. Glancing through the 1964 Annual Report with more than a casual interest, I find that you contributed over $12,000 to the 1963 Fund, placing the class 45 out of 66. Considering the fact that we are only five years out, this looks pretty good. Better yet, as of June of this year the class places 36th in the 1964 donations, so you are really doing well. Keep up the good work, because the physical growth alone of the Institute shows that your money is going where it will do the most good. New science and engineering centers, the Student Union (yes, it is finally well on its way to completion), student scholastic and environmental aid—they all reflect directly your continuing interest in M.I.T. . . . Now for personal news. After a three-year hitch in the Navy, **Steve Yeretsky** has been transferred from the Standard Magnesium and Chloride plant in Tulsa and is now helping to build a new one in Wendover, Utah. . . . **Scott Latimer** has been graduated from the USAF Squadron Officer School at Air University in Alabama after being selected "in recognition of demonstrated potential as a leader in the aerospace force" and has been assigned

to Dover AFB, Del. . . . **Harry Scherzer** has been appointed an assistant product manager of Kordite Corporation, and will handle sales and marketing development for the company's clear plastic packaging for the baking industry. . . . **Phil Nimmo** is a senior project engineer at GM's Proving Ground Noise and Vibration Lab in Milford, Mich., and recently contributed a paper on special measuring techniques to GM's Engineering Journal. . . . Also among recent papers is an article credited to **Bill Guyker,** a staff engineer at West Penn Power in Greensburg, Pa., for a study of telemetry advances. . . . **Richard Briggs** has joined the Lawrence, Radiation Lab in Livermore, Calif.; he and Kathleen have three children. . . . **Bill Rothstein** has been appointed a senior research analyst at Prudential Insurance in Newark, N.J., and has almost completed doctoral studies at Cornell. . . . **Bob Rosenfeld,** who received his Ph.D. from Caltech in 1962, recently joined the RCA Lab at Princeton, N.J.; it is little wonder that Bob attended the reunion sans mate, since she delivered their second son less than a month later. . . . Speaking of the reunion, your secretary fears that the news promised last month may have to wait again. I procrastinated too long in getting the information, and my wife seems to be ready to have a baby. Life is never dull around here. . . . (Last minute insertion, two hours before Class News deadline; Suzi Zeiders and 7 pound, 12 ounce baby girl doing fine.)—**Glenn W. Zeiders, Jr.,** Secretary, 3 Rose Avenue, Watertown 72, Mass.

'60

Reunion plans seem to be moving along. As you probably know, the reunion committee has chosen Wentworth-by-the-Sea, Portsmouth, N.H., as the site. The committee consists of Jack Edwards, Tom Farquhar, Ray Harlan, Harry Hopfenberg, Gerry Hurst, Jim Janak, Dick McDowell, Sue Schur, Chris and Linda Sprague, Sheila Widnall and myself. **Tom Farquhar** is the Reunion Treasurer and is working on the budget with **Dick McDowell. Jim Janak** and **Sue Schur** are co-publicity chairmen, **Ray Harlan** is handling publicity, and **Linda Sprague** is program chairman. The committee will be in touch with everyone directly. This column will also carry the news as it develops. . . . Turning to other news, there are quite a few clippings to catch up on. **Mike Rosner** finished his fourth year at New York Medical School last June. He and his wife Joan were living in Jackson Heights, N.Y., at last report. . . . **Jon Wigert** was awarded a Doctor of Medicine degree from the University of Mississippi in June. Jon is returning to Illinois for his internship at the University of Chicago Hospital and Clinic in Chicago. . . . **Russ Irvine** has been appointed assistant director of research for the Canadian Labor Congress. . . . **Sam Latt** began his internship at the Peter Bent Brigham Hospital in Boston after completing Harvard Medical School. . . . **Tom Cover** recently accepted an assistant professorship at Stanford in electrical engineering after receiving his Ph.D.

Ken Freeman joined the Bowdoin College faculty in September as an instructor in philosophy. Ken got his M.A. from Yale in '62. Ken and the former Miriam Still of Akron, Ohio were married in June in the Dwight Memorial Chapel at Yale. . . . **Ralph Cuomo** is now working for Bay State Abrasive Products Company, Westboro, Mass. Ralph recently graduated from the Harvard Business School. . . . **Richard Pack** was recently assigned to Nellis AFB, Nevada for duty in a unit of the Tactical Air Command. . . . Dr. **John A. van Raalte** recently joined RCA at the Sarnoff Research Center in Princeton, N.J. He received his doctorate from M.I.T. this last June. . . . **Ken Graham** is a first lieutenant in the Air Force and is working at the Air Force Systems Command's Space Systems Division in Los Angeles. . . . **John Chato** has taken a position as associate professor of mechanical and industrial engineering at the University of Illinois in Urbana. . . . **Ron Burde** was graduated from Jefferson Medical College of Philadelphia in June. . . . **Howard Meadors** completed an eight-week officer orientation course in May at Fort Gordon, Ga. . . . **George Meyers** received his pilot's commission at Craif AFB, Ala. and has been assigned to flying duty at Luke AFB, Ariz. . . . **James Duke** got his M.S. in mechanical engineeering from Rensselaer in June. . . . **James Halle** also received the same degree in June from Rensselaer. Merry Christmas—**John B. Stevenson,** Secretary, Partridgeville Road, Athol, Mass.

'61

With this column I have run out of return post cards from last spring's mailing. Thanks to all of you who wrote! Those who feel left out, drop me a card on your own and let your classmates know where you are and what you are doing. . . . **Bill Jouris** writes: "I am currently working as a technician at I.I.T. Research Institute where I have been employed for about five years. I am in the Health Physics Section and have been involved in radiation safety and dosimetry activities. I am currently completing the requirements for a B.S. in liberal studies with a major in chemistry at I.I.T." . . . **Royce Fletcher** is a senior associate engineer with IBM in Poughkeepsie, N.Y., working in memory-circuit design and development. The Fletchers' first child, a boy, arrived last May 28, and is named Scott Lloyd. . . . **Peter Büttner** and wife Marianne are located in the Washington area, living in Burke, Va. They stopped through M.I.T. last summer on their way home from a week's vacation in Maine, but I missed them, unfortunately. . . . **Nelson Stefany** should have been added to last month's list of June advanced degree recipients; he obtained his S.M. from M.I.T. in chemical engineering. He is now with Rohm and Haas Company, a Philadelphia plastics and chemical manufacturer, at their Bridesburg, Pa., research laboratories. The Stefanys live in Abington, Pa. . . . Two others in the same category are **Paul Yaffe,** who obtained his M.S. in metallurgy at Case Institute of Technology, and **Terry Langendoen,** who received the first M.I.T. doctorate in linguistics. He spent his summer with IBM in Yorktown Heights, N.Y., moved on this fall to the post of assistant professor in linguistics at Ohio State University. Terry married Sally Wicklund in the M.I.T. Chapel last August 16; the Langendoens honeymooned in Quebec and Ontario. Our best wishes to Sally and Terry.

John Buoncristiani was a Ph.D. candidate at Northwestern University at time of writing, hoped to have his degree by now. . . . **Lenny Hess** completed his Army hitch and is in his second year at Columbia Law School. . . . **Karl Josephy** is at Columbia, going for his Sc.D. in electrical engineering. Rachel Lea Josephy was born January 12, 1964. . . . **Harry Rosenzweig,** who is going for his Ph.D. in mathematics at the University of Virginia, is teaching half time. Son Scott is now 1½ years old. Harry saw **Bipin Patel** when he was last at Yale; Bipin expected his Ph.D. in chemistry in August, 1964, at that time. . . . An Army press release traces the activities of Second Lieutenant **Michael Zimmerman;** he obtained his master's degree at Columbia in 1963, is now in the Army, having completed the ordnance officer basic course at Aberdeen Proving Ground in Maryland last summer. . . . **Tony Kramer,** who expects to finish his Ph.D. thesis in electrical engineering at Stanford in about a year and a half, reports California weather to be a major improvement over Boston's.

Author! Author! The past year has seen at least three of our ranks with articles in various publications. **Pete Burleson** was one of three authors of an article appearing in the Journal of the Association for Computing Machinery for June, 1964, ("Symbol Manipulation in FORTRAN-SASP I Subroutines"). **Craig Tedmon** co-authored an article in the April, 1964, Journal of Metals; the subject was substructure and impurities in niobium single crystals. **Peter Ross** wrote an article for the Peace Corps Volunteer on the importance of Corps workers knowing the language of the area to which they are assigned. Sent to India, he has evidently made good use of the Telugu he learned before going there. (Between graduation and his Peace Corps work, Pete found time to tour Europe, where he lived with a Swedish family and worked on a 1,000-acre farm, as well as earn his M.S. in mathematics at Berkeley.)

A Course XXI newsletter carries information about a number of our classmates. Herewith is a condensed version, covering items not already mentioned in this column: **Bob Fisher** is studying for his master's degree in design at Syracuse University and teaching two design courses. . . . True Fisher is teaching 10th and 11th-grade English in one of the local high schools. . . . **Don Fowles** is a tutor in social relations in Winthrop House, Harvard University, and teaches a seminar for sophomores in social relations. He is also working on a research project concerned with staffing problems in hospitals. He has taught in the intro-

ductory survey course in social relations and is preparing to write his dissertation on biochemistry and learning theory. . . . **Lee Giesecke** lives in Arlington, Va., working as a programer for System Development Corporation. He reports that "the work is more interesting than engineering and almost matches the creative arts in creativity per unit dog-work." . . . **Jerry Grossman** who is a fourth year student at Pennsylvania Medical School, spent the summer at M.I.T. studying computer diagnoses of electrocardiograms and helping to orient foreign students for the Boston Area Seminar for International Students. . . . **John Maslanka** is currently teaching mathematics at Wentworth Institute in Boston. He reports that he has enjoyed teaching for three years now. He is working toward his master's degree in the classics at Boston University.

Also from the newsletter is the report that **Martin O'Connell** was granted an Ll.B. from Boston College and is now with Kenway, Jenney and Hildreth, a Boston law firm. . . . **Gardner Perry** is working on a research project in meteorology at M.I.T. . . . **Laurence Rothman** writes: "Upon graduating, I joined a small research and optical instrumentation company, Lock Associates, Inc. While the world was hearing of the glamorous flights of the Gagarins and Glenns and possible rocket flights to the moon, I was busy attaching small instruments in gondolas to balloons and sending them aloft to the stratosphere. Last year I worked at the Air Force Cambridge Research Laboratory on gasses in the far-infrared region of the electro-magnetic spectrum. I am presently on a teaching fellowship at Boston University and hope to receive my master's degree in physics this year." . . . The last item from the Course XXI newsletter tells that **Ray Waldmann** was graduated from Harvard Law School in June. He was married in August, 1962, and has spent two summers as a technical editor for the Apollo Project at the M.I.T. Instrumentation Labs.

The report of the 1964 Alumni Fund has recently come out; 14,971 contributors gave $968,880, this total putting us "in the company of the top dozen college funds in the country." (Yale reports $3 million and Harvard $2-½ million.) Our own **Ken Kotovsky** and **Grady Harris** were among the 1,858 volunteer workers who did the job. Of the 1,327 on our active class roll, 226 classmates or 17 per cent responded to the letters with a total of $2,682. The Fund came very close to hitting its established goal of $1 million. This year the goal is $1-½ million. With more and more of our number leaving school and the service and entering careers, we should certainly be able to continue expanding the number of '61 contributors. By all means, give real thought to your participation in the Fund this year. . . . And now it is time to wish you all a Merry Christmas and a Happy New Year. See you in the January, 1965, column, when I will have something to say about this column and its future authorship.—**Joseph Harrington, 3rd,** Secretary, 22 Hidden Road, Andover, Mass. 01810.

'63

Not much news this month. Our class had the highest average contribution to the 1964 Alumni Fund of any class to graduate since 1959—not bad considering most of us are still in school. Of course, total contribution is something else again. . . . **Joseph Alexis** is now a second lieutenant in the Air Force; **Ken Weyler** won his wings and is now with a unit supporting the MATS in McChord AFB, Wash. . . . **Don Dreisbach** is working on his Ph.D. in philosophy at Northwestern, **Herb Eagle** is in math at Brown, **Ken Friedman** is back at M.I.T. this year, **Laurence Gardner** is at Harvard Medical School, as is **Tony Weikel**. . . . **Bob Morse** is at Harvard Law School. . . . **John Castle** was picked as a Baker Scholar at the Harvard Business School, this is the highest scholastic honor the school gives before graduation. . . . **Neal Grossman** is with the Peace Corps in Nigeria. . . . Season's Greetings, and write me a post card.—**Bob Johnson,** 11 Myrick Street, Allston 34, Mass.

'64

Due to space limitations in the last issue, we were cut off half way through the alphabet. This issue will complete almost all of the information on our classmates that I had received before our graduation. Now I will really be looking for news, so please send further information about yourself and other members of '64. . . . **Carl Mampaey** of Scarsdale, N.Y., is in graduate school at Illinois. . . . **Jose Maranhao** of Rio de Janeiro is serving in the Brazilian Navy. . . . **Lita Markley** of Ozone Park, N.Y., is in graduate school at Harvard. . . . **Thomas Marnane** of Purcel, Okla., is a lieutenant in the Navy. . . . **S. A. Mayman** of Timorim, Israel, is an AECL supervisor. . . . **John MacIntyre** of Philadelphia is in graduate school at M.I.T. **Scotty MacVicar** of Flint, Mich., is at M.I.T. on a NSF Traineeship. . . . **Douglas McCowan** of Springfield, Mass., is at the University of Maryland with a teaching assistantship. . . . **John McCrickerd** of Allentown, Pa., is in graduate school at Caltech. . . . **Richard McEntire** of Newport, R.I., is in graduate school at Minnesota with a teaching assistantship. . . . **Robert McKean** of Omaha, Neb., is at M.I.T. with an assistantship. . . . **Stanley McKenzie** of Yakima, Wash., is in graduate school at Rochester with a scholarship. . . . **Edward McMahon** of North Arlington, N.J., is working for General Electric as a systems analyst. . . . **John McNamara** of Claremont, N.H., is working in the M.I.T. Lincoln Labs. . . . **Robert Mehrabian** of Tehran, Iran, is in graduate school at M.I.T. on a research assistantship. . . . **Ben Melkun, Jr.** of Whitestone, N.Y., is working as a programer for IBM. . . . **Gail Ulrich,** Devils Slide, Utah, is working for North American Aviation. . . . **John Van Saun,** Rochester, N.Y., is studying at Carnegie Tech. . . . **John Mertens, Jr.** of Dallas is in graduate school at Michigan. . . . **Stephen Meyer** of Minneapolis is a college staff member of the Campus Crusade for Christ. . . . **Jeffrey Michel** of New Orleans is at Tulane with a teaching assistantship. . . . **Don Mided** of Skokie, Ill., is in the Peace Corps in Ecuador. . . . **Peter Miller** of Gibsonton, Fla., is in graduate school at M.I.T. . . . **Steve Miller** of Toledo, Ohio, spent the summer in Europe and is now back at M.I.T. graduate school. . . . **Arnold Mindell** of Schenectady, N.Y., is in graduate school in Zurich, Switzerland. . . . **Edgar Mitchell** of Artesia, N.M., is working for NASA in Houston. . . . **Joseph Mobius** of Bellmore, N.Y., is working in Japan. . . . **Cary Mock** of Arlington Heights, Ill., is working for Westinghouse. . . . **William Mohn, Jr.** of Tampa, Fla., is working for IBM. . . . **Khalid Mohtadullah** of Peshawar, West Pakistan, is working in the government of his country. . . . **James Monk, Jr.** of Altus, Okla., spent the summer in Europe and is now working for Goodyear Institute. . . . **Pedro Mora-Mena** of Rio Piedras, Puerto Rico, is working for the Puerto Rico Industrial Development Company. . . . **David Morrison** of Pittsfield, Mass., is in graduate school at the University of Massachusetts. . . . **William Morton** of Mount Vernon, N.Y., is at M.I.T. with a NSF Traineeship. . . . **Jack Motor** of Reading, Pa,. is in graduate school at Berkeley. . . . **Rafael Munoz** of La Paz, Bolivia, is working for the Bolivian Gulf Oil Company. . . . **Michael Murray** of Tulsa, Okla., is in graduate school at Berkeley. . . . **Geoffrey Nelson** of Norwood, Mass., was married August 22 and is now at Stanford in the business school. . . . **Paul Newell, Jr.** of Knoxville, Tenn., is at M.I.T. with a NSF Fellowship. . . . **Richard Nixon** of Cromwell, Conn., was married September 5 to Nancy Bruce of Cromwell and is now at M.I.T. with a NSF Fellowship. . . . **Russell Norris** of Maywood, N.J., is in graduate school at either Pennsylvania or Kansas. . . . **Herbert Norton** of Hammond, Ind., is at Columbia with a teaching assistantship. . . . **Anthony Nunes** of New Bedford, Mass., is at M.I.T. with an assistantship. . . . **Melvin Olivin** of Kew Gardens, N.Y., was married July 11 to Carol Corde of Wellesley College and Garden City, N.Y. He is now at the State University of Iowa with an assistantship. . . . **Richard Ollins** of Hicksville, N.Y., is working for the Hewlett-Packard Company. . . . **Edward Olsen** of Orlando, Fla., is at Caltech with a tuition scholarship and research assistantship. . . . **Jon Orloff** of Portland, Ore., is in grad school at Pennsylvania. . . . **Neil Orloff** of Chicago is at Harvard Business School. . . . **Marty Ormond** of Aurora, Ill., is in grad school. . . . **Masaharu Oshima** of Tokyo is working for the Chiyoda Chemical Engineering and Construction Company. . . . **Alton Otis, Jr.** of North Abington, Mass., is in graduate school at Illinois. . . . **Joseph Parchesky** of West Medway, Mass., is working for Electro-Mechanical Research. . . . **Robert Park** of Montreal is at Harvard. . . . **Roger Parks** of Fort Lauderdale, Fla., is working for McDonnell Aircraft Company. . . .

Benno Patsch of Black Creek, British Columbia, had no definite plans at the time he wrote. . . . **Martin Patt** of Malden, Mass., is at M.I.T. on a RCA Fellowship. . . . **Barry Pearlstein** of Levittown, N.Y., is working as an associate engineer at Ford-Aeronutronic in California. . . . **David Perkins** of Farmington, Maine, is attending graduate school at M.I.T.

Otis Philbrick of Westwood, Mass., is in graduate school at Northeastern. . . . **Donald Phipps** of Dartmouth Devon, England, was married to Mary Kay Jones of Hanover, Mass., on September 19 and is now in graduate school at McGill. . . . **George Piotrowski** of Syracuse, is at M.I.T. with a research assistantship. . . . **Stanley Plotnick** of Montreal is working for Superior Electronics, Ltd. . . . **Robert Pollak** of Cape Coral, Fla., is a lieutenant in the Navy. . . . **Richard Posner** of Silver Spring, Md., is in graduate school at M.I.T. . . . **Allan Press** of Rockville, Conn., is at Clark University. . . . **John Prokopy** of Lansdale, Pa., is in graduate school. . . . **Thomas Provost** of Feeding Hills, Mass., is in graduate school at M.I.T. and working as a computer programer. . . . **Satish Puri** of New Delhi is in graduate school at Stanford. . . . **Lawrence Rabiner** of Brooklyn is in graduate school on a N.S.F. Fellowship. . . . **Henry Rack** of New York City is at M.I.T. . . . **Mahin Rahmani** of Teheran, Iran, returned to her country in September. . . . **John Rainier** of Tulsa, Okla., is in graduate school at M.I.T. . . . **Gary Rauch** of Dayton, Ohio, is in graduate school at Illinois with a NSF award. . . . **Martha Redi** of Bloomfield, Conn., is in graduate school at Rutgers. . . . **John Reed** of Kingsport, Tenn., was married on July 11 to Dale Volberg of Kingsport, Duke, and Harvard. He is now at Columbia with a N.I.H. Fellowship. . . . **William Remsen** of El Centro, Calif., is in graduate school at Michigan. . . . **Tiina Repnau** of Los Angeles had no definite plans at the time of writing. . . . **Melvyn Reznick** of Los Angeles is in graduate school. . . . **Richard Reznik** of Cleveland, Ohio, is in graduate school at Case. . . . **Harry Richter** of Staatsburg, N.Y., is working for IBM in Poughkeepsie. . . . **Arthur Rieser** of New York City is in graduate school at Columbia. . . . **Dennis Ripple** of El Campo, Texas, is working for the Celanese Chemical Company. . . . **Peter Robb** of Albany is working for the Norton Company in data processing. . . . **William Roberts, Jr.** of Huntington, W. Va., is at M.I.T. with a teaching assistantship. . . . **Anthony Robinson** of Houston is in medical school at New York University. . . . **James Rome** of New York City is at M.I.T. on a teaching assistantship.

Robert Rothman of Rome, Ga., is in graduate school at Northwestern. . . . **Paul Rovner** of Newton, Mass., was married June 14 and is now at Berkeley with a teaching assistantship. . . . **Murray Ruben** of Flushing, N.Y., is working for Tyco Labs, Inc. . . . **Jose Rubinstein** of Bogota, Colombia, is in graduate school at the Polytechnic Institute of Brooklyn. . . . **Allison Russell** of Lancaster, New Brunswick, is in graduate school at Illinois. . . . **David Russell** of Springfield, Vt., is working Eastman Kodak Company. . . . **John Rykowski** of Schenectady, N.Y., was married to Margaret Olsen on June 13 and is now in graduate school at Duke. . . . **Dave Saarela,** of Virginia, Minn., is serving in the Marines as a lieutenant. . . . **Charles Salisbury** of North Andover, Mass., is working for IBM in Kingston, N.Y. . . . **Robert Sanders** of Chicago is in graduate school at Illinois. . . . **Harry Sauerwein** of Belleville, Ill., is working for the Aerospace Corporation. . . . **Thomas Schiller** of Stamford, Conn. is in the military. . . . **William Schipul** of Stratford, Conn., is in graduate school at Syracuse. . . . **James Schomer** of Jackson, Mich., is at Purdue with a teaching assistantship. . . . **Herman Schutten** of Milwaukee is working for the A.C. Spark Plug Company. . . . **Robert Scott** of Montreal is at M.I.T. as an assistant to the dean of engineering. . . . **William Shack** of Pittsburgh is at Berkeley with a NSF Fellowship. . . . **Donald Shapero** of Palo Alto, Calif., is at M.I.T. with a NSF award. . . . **Yaacov Shapira** of Jerusalem, Israel, is at M.I.T. in the Magnet Lab. . . . **Ed Shibata** of Gallup, N.M., is at M.I.T. with a research assistantship. . . . **Bernard Shiffman** of Los Angeles is at Berkeley with a fellowship. . . . **Uri Shimony** of Haifa, Israel, has no definite plans at this writing. . . . **Robert Shoemaker** of Franklin, N.J., is working for General Mills. . . . **Don Siefkes** of Lincoln, Neb., is in the Peace Corps. . . . **Fred Silverstein** of Massapequa, N.Y., is at Cornell.

Michael Simpson of Lehighton, Pa., is working for the Pennsylvania Power & Light Company. . . . **Arthur Smith** of Providence, R.I., is in graduate school at M.I.T. . . . **Dennis Smith** of Syracuse, is at Berkeley with a teaching assistantship. . . . **Maxim Smith** of Lorain, Ohio, is in graduate school at M.I.T. . . . **Wayne Soverns, Jr.** of Larchmont, N.Y., is in graduate school at M.I.T. in architecture. . . . **David Spencer** of Great Neck, N.Y., is working for Edgerton, Germeshausen & Grier. . . . **Alexander Spiridon** of Beirut, Lebanon, is in graduate school. . . . **Clint Sprott** of Memphis, Tenn., is in graduate school at Wisconsin. . . . **Robert St. Aubin** of New Bedford, Mass., is at Pennsylvania Law School. . . . **Bruce Stevens** of South Weymouth, Mass., is at M.I.T. School of Chemical Engineering Practice with a fellowship. . . . **Glenn Stith** of Independence, Kansas, had indefinite plans at this writing. . . . **Janet Stober** of Gales Ferry, Conn., is in graduate school at the University of Colorado. . . . **David Straight, Jr.** of East Greenwich, R.I., is at M.I.T., with a Sloan School scholarship. . . . **Bruce Strauss** of Elizabeth, N.J., is engaged to Judi Schleimer of East Brunswick, N.J., and is now at M.I.T. with NSF traineeship. . . . **Michael Stulbarg** of Cincinnati is at Harvard Medical School. . . . **Suhas Sukhatme** of New Delhi, India, is working for Dynatech Corporation. . . . **Dave Sullivan** of Ormond Beach, Fla., was married to Margaret Mazza of Gloucester June 13 and is now working for RCA. . . . **George Sullivan** of Kansas City, Mo., is in graduate school at Stanford. . . . **Harry Surline** of Laramie, Wyo., is in graduate school at Cornell. . . . **Albert Teich** of New York City spent the summer in Europe and is now in graduate school at M.I.T. . . . **James Tillotson** of Belmont, Mass., is working for DuPont. . . . **Daren Tomlinson** of Portland, Ore., is at M.I.T. with a NSF Fellowship. . . . **Bui An Ton** of Saigon is working in the math research center at the University of Wisconsin. . . . **Donald Topkis** of Bala-Cynwyd, Pa., is in graduate school at Stanford. . . . **Don Torrieri** of Baltimore is at the Polytechnic Institute of Brooklyn with a research fellowship. . . . **Paul Troiano** of Roslindale, Mass., is working for the Cabot Corporation. . . . **Francis Tuggle** of Lakewood, Calif., is at Carnegie Tech with a GSIA Fellowship. . . . **James Turney** of Indiana, Pa., is working for H. P. Hood & Sons, Inc., in Boston. . . . **Charles Tyler** of Sabinal, Texas, is at Washington University in St. Louis with an assistantship. . . . **Carl Uhrmacher** of Fort Worth is at Illinois with a NSF Fellowship.—**Ronald L. Gilman,** Secretary, Dane Hall 204, Cambridge, Mass., 02138.

Sloan Fellows

Sloan Fellows who have recently been promoted include: **William S. Wheeler, Jr., '54,** who was formerly vice-president of Government and Industry Relations at Motorola, Inc. has been promoted to a member of the senior staff assigned to the Engineering Division at Arthur D. Little, Inc. . . . **James I. Spiegel, '64,** who was manager of the Valve and Auxiliary Equipment Subdivision at Pittsburgh for Westinghouse Electric Corporation is now assistant to the general manager, Marine Product Division, Westinghouse Electric Corporation. . . . **Daniel K. Chinlund, '50,** was promoted from assistant manager of the Allentown Works of the Western Electric Company to general manager of the Company's Service division, Southern Region. . . . **Harold J. Fitzgeorge, '64,** formerly an exploration adviser in the Exploration and Producing Department of Socony Mobil Oil Company has been promoted to vice-president and exploration manager with Socony Mobil Oil of Canada. . . . **Abraham Katz, '58,** a former member of the Technical Staff, R.C.A. Advanced Military Systems, R.C.A. Laboratories is now Project manager for the economic studies of the supersonic transport for the United States Department of Commerce. . . . **Robert H. Cramer, '63,** formerly supervisor, Oil Shale Research Department for the Socony Mobil Oil Company, Inc. has been promoted to program manager of the oil shale research program. . . . **Edward H. Carman, 3d, '59,** formerly Administrative Assistant, Professional Sales Division, Eastman Kodak Company is now manager of marketing agreements at Eastman Kodak Company.—**Peter P. Gil,** Room 52-455, M.I.T., Cambridge 39, Mass.

Club News

Southern Californians See How Ranger VII Saw Moon

The M.I.T. Club of Southern California held its fall meeting September 22 on the campus of the California Institute of Technology, and President Lee A. DuBridge presented a discourse on the Ranger VII shot to the moon. Slides covering the ground-station locations as well as the details of the instrumentation necessary to produce the Ranger VII pictures were shown. The stills had been combined to produce a motion picture showing the area seen by the television cameras as the Ranger VII approached the moon surface. A capacity audience of more than 120 alumni, their wives, and guests attended.

The annual winter meeting of the Club is scheduled for Tuesday, January 19, at the Los Angeles Athletic Club. The guest speaker will be Colonel Charles Yeager, Training Commandant at the Edwards Air Force Base in California. Colonel Yeager was the first man to fly faster than the speed of sound in the original X-1 supersonic airplane.

Our long-time member, Robert Welles, '15, was awarded the Bronze Beaver Award at the Fifth Alumni Officers' Conference held at M.I.T. in September, for his outstanding work on the M.I.T. Educational Council, in addition to his continuous support of club activities in the Los Angeles area.—Arthur Schwartz, '47, Secretary, 144 South Camden Drive, Beverly Hills, Calif.

Western Pennsylvania Club's Officers Are Announced

At the first general meeting of the M.I.T. Club of Western Pennsylvania on October 26, Professor Phillip A. Drinker of M.I.T. presented a very interesting description of medical research at M.I.T. Professor Drinker is the son of the inventor of the iron lung, and he has carried on this tradition by building a pediatric respirator for small children.

James B. Allen, '36, President of the Club, announced the following list of officers for 1964-1965: Eli I. Goodman, '50, Vice-president and secretary; Hugo C. Johnson, Jr., '46, treasurer; Harry F. Raab, Jr., '50, assistant secretary; William M. Laird, '43, publicity chairman; Ward Powell, Jr., '46, membership chairman; Charles R. Holman, '36, James B. Allen, '36, Edward F. Murphy, Jr. '41, Ben W. Steverman, '31, Ernest U. Buckman, '46, Hugo C. Johnson, '46, James L. Taylor, Jr., '02, Jerry P. Hahn, '47, and Bernard Lewis, '23, directors. Chairman of the Educational Council is Henry Avery, '41, and Regional Chairman of the Alumni Fund is Donald A. Levenson, '48.—Harry F. Raab, Jr., '50, Secretary, 5053 Grove Road, Pittsburgh, Pa. 15236.

130 Long Islanders Inspect Moon Spaceship Mockups

The M.I.T. Club of Long Island held its third annual freshman get-together on September 2. A total of 130 freshmen, parents and club members were guests of the Grumman Aircraft Engineering Corporation at Bethpage, N.Y. Mockups of the LEM spacecraft which will land two Americans on the moon in NASA's Project Apollo were inspected. Other Grumman space research facilities and an astronaut-suited alumnus, Edward J. Keating, '58, were on exhibit. M.I.T. alumni in high level positions at Grumman include: Joseph G. Gavin, Jr., '41, vice-president and director of the LEM program; Robert S. Mullaney, '61 Sloan Fellow, program manager; and Arnold Whitaker, '46, systems project engineer. (A photograph of Mr. Keating, the LEM, and two guests is on page 10.)

A round table discussion of current Institute activities, sports, student government, fraternities and dormitories was led by several undergraduates, and an M.I.T. film, "To Greater Strength," was shown. The success of this type of meeting is indicated by the eager participation by members of the classes of 1966 and 1967 who had attended freshmen get-togethers before. The meeting was organized by a committee headed by Robert I. Kraus, '42, and Frank Finnegan, '50.—Douglas A. Tooley, '28, Secretary, 11 Cider Mill Lane, Huntington, N.Y.

Detroit Alumni Learn About Creative Synthesis

The M.I.T. Club of Detroit launched this year's activities October 13 with a dinner-meeting at which Stefan Habsburg-Lothringen, '55, senior project engineer at the General Motors Styling Studio, spoke on "The Creative Attitude." His talk did not specifically concern vehicle styling but rather dealt with the general order of steps in creative synthesis stressing the proper role of critical appraisal.

Other forthcoming events include: December 22, Tuesday—luncheon meeting with vacationing Detroit area M.I.T. students; January 26, Tuesday—dinner meeting with speakers Professor John Wulff of the Metallurgy Department and Don Carpenter, '22, President of the Alumni Association. Anyone interested in attending these meetings should contact Frank G. Rising, '59, 646-6789, for confirmation of dates and locations.—John C. Erickson, '55, Secretary, 2025 Vernier Road, Grosse Pointe Woods, Michigan 48236.

Boston Is the Subject At Boston Club's Meeting

The M.I.T. Club of Boston held its first luncheon of the year at the Union Oyster House, Boston, on October 15. Gordon Logue, Director of the Boston Redevelopment Authority spoke on the new Boston to 112 members and guests. Members of over 45 classes attended the meeting.—Bruce B. Bredehoft, '56, Secretary, Loomis, Sayles and Company, 140 Federal Street, Boston.

Washingtonians Will Hear Professor Mickley in January

The extensive participation of Washington, D.C. area alumni in Institute affairs was indicated by the attendance at the Fifth Alumni Officers' Conference held September 11-12 at M.I.T. Representing the club were Paul M. Robinson, Jr., '44, President, and Robert W. Balke, '41, a past president who is also an Educational Counselor and Alumni Fund worker. Samuel Bensinger, '31, attended on behalf of the Educational Council; James E. Harper, Jr., '32, was present as an officer of his class; Richard H. Abrams, Jr., '59, as chairman of the northern Prince George County Alumni Fund Region; and Richard H. Lane, '54, Leon S. Pocinki, '54, and Harry J. Zimmer, '51, as representatives of the Alumni Fund. Sterling H. Ivison, Jr., '41, immediate past president of the Club, Alumni Fund Regional Chairman for Bethesda-Chevy Chase, and Fund Co-ordinator for the D.C. area, was the recipient of a Bronze Beaver Award for his outstanding participation in alumni affairs. He was unable to attend the conference, and the award was accepted for him by Club President Robinson.

Robert B. Riley, '54, who was elected Club Secretary last April after being event chairman for the February and April meetings, and who was also Fund Chairman for the Silver Spring, Md., region, moved to Albuquerque, N.M., in early August, to practice architecture.

Fall plans for the Washington Club included a beer party, due October 6 at the Potomac Boat Club and a dinner meeting October 22 at the Cosmos Club, with Dr. Alan T. Waterman, former head of the National Science Foundation, as speaker.

The annual student-alumni luncheon is set for Monday, December 28 at the Cosmos Club; Harold S. Mickley, '46, Director of the M.I.T. Center for Advanced Engineering Studies, will speak January 26 at a dinner meeting at the Cosmos Club; and a tour of the Naval Observatory is scheduled for April 8. The program was arranged by Gilbert H. Lewis, '51, first Vice-president.—Paul M. Robinson, Jr., '44, President, 8009 Jansen Drive, Springfield, Va.

New Jersey Alumnus Tells About Bell Switching System

The Immortal Machine, described by Ray Ketchledge, '41, fascinated 44 alumni and and their wives on September 24 at the Robert Treat Hotel in Newark, N.J. The description of the magnitude, capability and reliability of Bell System's new electronic switching system was impressive and was made more so by the obvious enthusiasm and skillful delivery of the speaker. The machine is a dual computer with the amazing ability to rearrange its own circuits, compensate for faults, check its work and never lose its programs.

This meeting was the first of the season and several new members were welcomed. The next meeting will be a family picnic at the Plazl Brauhaus at Haverstraw, N.Y.—Bernard S. Liss, '43, Secretary, 154 Elmwood Avenue, Glen Rock, N.J.

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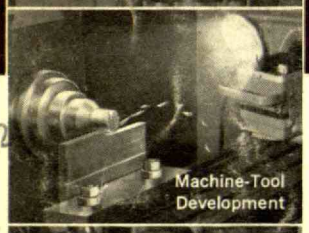

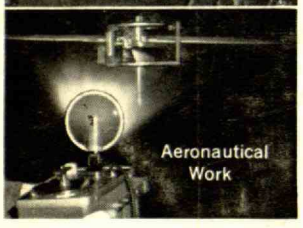

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